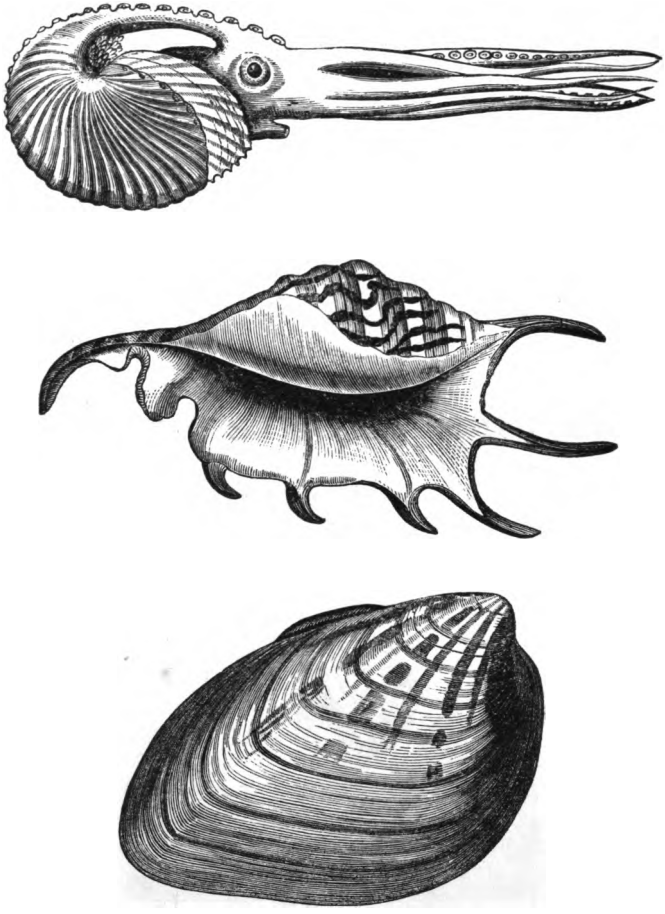


THE PAPER SAILOR. THE SCORPION-SHELL. THE UNIO.

PICTURES AND STORIES OF ANIMALS

FOR

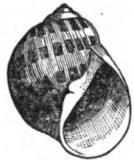
THE LITTLE ONES AT HOME.

BY

MRS. SANBORN TENNEY.

SEA, LAND, AND RIVER SHELLS.

WITH ONE HUNDRED AND TWENTY-FOUR WOOD ENGRAVINGS.



NEW YORK:
SHELDON AND COMPANY,
498 AND 500 BROADWAY.
1868.

PICTURES AND STORIES OF ANIMALS

FOR THE LITTLE ONES AT HOME

By Mrs. Sanborn Tenney.

In Six Volumes. Each Volume complete in itself. Containing 500 *Wood Engravings.*

QUADRUPEDS.

BIRDS.

FISHES AND REPTILES.

BEES, BUTTERFLIES, AND OTHER INSECTS.

SEA SHELLS AND RIVER SHELLS.

SEA-URCHINS, STAR-FISHES, AND CORALS

PREFACE.

BELIEVING that there is nothing in which children are naturally more interested than they are in animals, and that there are no other objects which can be used to greater advantage than these in their instruction, the writer has prepared these Pictures and Stories of Animals for the Little Ones, to instruct as well as to interest and amuse them.

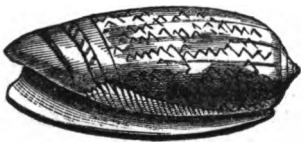
There are six books in the series, each one complete in itself; and they are so arranged that together they make a Juvenile Library of the Natural History of Animals.

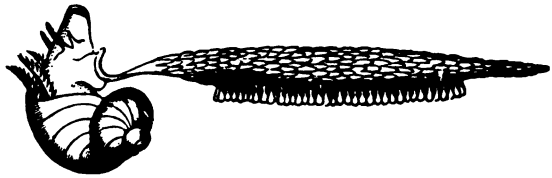
The first book contains pictures and stories of Mammals or Quadrupeds; the second book, pictures and stories of Birds; the third, of Reptiles and Fishes; the fourth, of Bees, Butterflies, and other

Insects, and of Crustaceans and Worms; the fifth, of Shells, and the animals which live in them; and the sixth, of Sea-Cucumbers, Sea-Urchins, Star-Fishes, Jelly-Fishes, Sea-Anemones, and Corals.

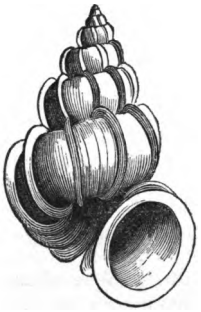
The wood engravings in the six books are more than five hundred in number, and are true to nature. Several of them were drawn and engraved expressly for this series; the others are mainly from Tenney's "Manual of Zoölogy," "Natural History of Animals," and other works of Tenney's Natural History Series.

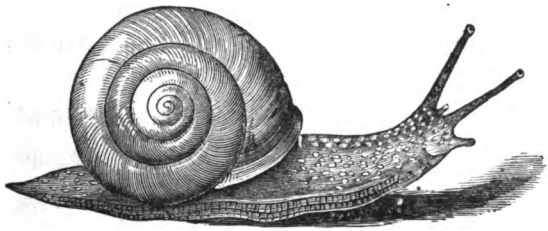
August, 1868.





CONTENTS.





PICTURES AND STORIES OF ANIMALS.

DEAR CHILDREN: —

YOU remember your pleasant visit to the sea-shore, and how you liked to run and play upon the smooth beach, and to pick up the pretty pebbles, and shells, and sea-weeds which you found there. And you like to play with the shells which you find in the brook, which runs through the meadow, and with the pretty coiled snail-shells which you find under the leaves in the woods, when you are looking for nuts. And you like to look at the beautiful sea-shells in your father's cabinet, and to hold the large ones to your ear and to listen to the sound of the roaring sea which you think you hear in them. So I am sure you

will like to look at pictures of shells, and read little stories about them and the curious animals which live in them.

You have often heard these animals called Shell-Fish; but that is not a true name for them, because they are not formed like fishes, and many kinds do not even live in the water, nor do all of them have a shell; so they have been called by another name, which can be truly given to all of them; and this name is Mollusks, and it comes from a word which means soft, and it is given to these animals because they have soft bodies.

Some kinds of mollusks live in the sea; other kinds live in lakes, ponds, and rivers; and others live upon the land.

Of those that live in the sea, some kinds live in the shallow waters near the shore, and other kinds live on the muddy flats where the water flows over them when the tide is high, but where they are out of the water when the tide is low; some kinds live where the bottom of the sea is rocky; other kinds live where the bottom is sandy; and others where the bottom is muddy; some kinds live far down in the sea, and some

kinds live on the surface of the sea, far out of sight of the land.

Of those that live upon the land, some kinds are found in low, wet, and shady places; some kinds are found on high mountains; some kinds on rocks; some kinds on trees; some on sunny banks; and others burrow in the ground.

Some kinds of mollusks are free and move about from place to place; others attach themselves to some object in the sea and remain fixed there for life. Some kinds fasten themselves to sea-weeds; others bore into timbers, and even into the solid rocks; and some kinds spin silken threads — called a byssus — by which they fix themselves to various objects in the sea.

Of those that are free, some kinds creep slowly about, or drag themselves along; some kinds can take short leaps; some kinds swim by opening and shutting the two parts of the shell; and others by taking in water and quickly forcing it out again; some kinds walk by means of their long arms, and others glide along upon the surface of the water.

Some kinds of mollusks feed upon plants, and

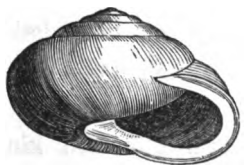
others eat animal food. The mollusks in their turn are the food of many other animals. The right whale, the largest animal in the world, feeds upon the small kinds which swim about in the open sea. The cod and haddock, and many other fishes which we eat, fatten upon those that live near or on the bottom of the sea. Many kinds of sea-birds feast upon those left upon the shore by the tide. The oyster, the clam, and the scallop are choice food for man. In those seasons when food is scarce, the poor people who live near the sea-coast depend upon mollusks for a large part of their daily food.

In your little book about Fishes I told you that many vessels go every year to some parts of the cool seas to catch and bring home those fishes that are good for food. Now every little boy who goes a fishing knows very well that he must take a good supply of bait. And these vessels must also have a good supply of bait, and so for this purpose they take barrels and barrels of mollusks.

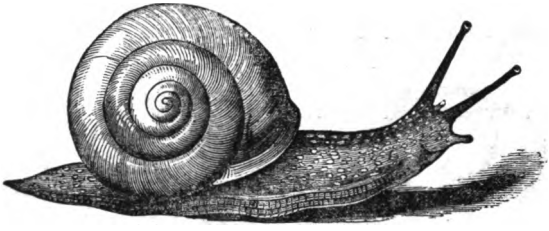
These animals are useful in another way; some of them yield beautiful dyes. The people who lived many years ago obtained some of their

richest and most famous colors from these little animals. From their shells are made buttons, knife-handles, shell-cameos for jewels, and many other useful and beautiful articles. The beautiful and costly pearls are found in mollusks.

The shells of mollusks are very beautiful. Pearly within, and also without when they are polished, and of soft and delicate colors, they are the delight of every one, and are eagerly sought for and often highly prized. But beautiful as the shells are, they give you only a faint idea of the appearance of the mollusks when they are alive, as I will now show you. Here is a picture of the



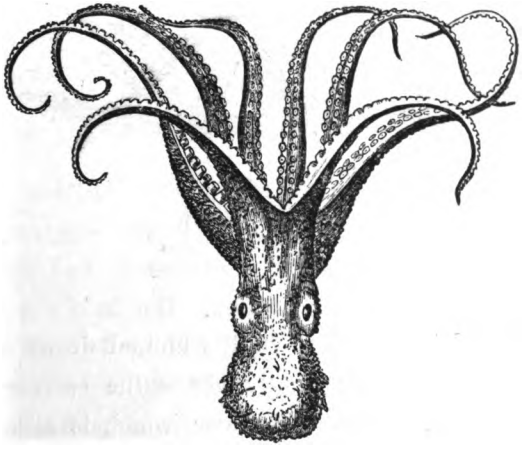
common snail-shell as it looks when the animal is dead, or when it has withdrawn into its shell; and on the next page there is a picture of the same shell as it looks when the animal is alive and expanded.



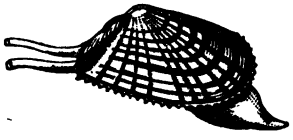
Perhaps you have sometimes thought that the shell is only the house in which the little snail lives, and that it can leave the shell and come back to it whenever it pleases. But it is not so. Although it can spread itself out far beyond the edge of its shell, or draw itself within so that it is wholly shut in and hidden from sight, still the shell is attached to the soft body of the animal, and is as much a part of itself as your little bones are a part of yourself.

There are several thousand kinds of mollusks, and they differ from one another very greatly in form. Most of them have a shell, but some of them have none; and of those that have a shell, most have it upon the outside, but in some cases it is within the animal. The shell is sometimes only one piece, sometimes it consists of two pieces, and sometimes of even more than two pieces.

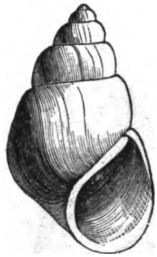
Some kinds of mollusks, like the one in this picture, have a large head with great staring eyes



upon the sides; some kinds have the eyes on long stalks or stems, like the common snail whose picture you have just seen; while others are without eyes, and even without a real head. Some kinds

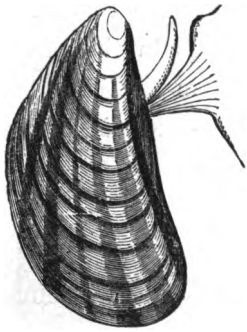


have many feet; others have only one foot; and others have none at all. Many shells are of a spiral form, that is, they are coiled as you see



in this picture, and when the animal draws itself within its shell, it tightly closes the opening by means of a little lid, or door, which is attached to its body, and which fits the open part of the shell. You can see this little lid in this picture; it is called the operculum, which means a cover, or lid.

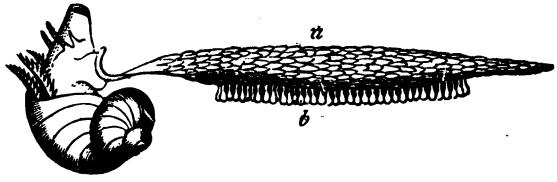
I have told you that some of the mollusks can spin silken threads by means of which they fasten themselves to weeds, rocks, or timbers, or to the



bottom of the sea or river. In this picture you see one of these animals and its silken threads, or byssus.

In your little book about Insects, I told you that a caterpillar lays from three hundred to five hundred eggs; but some of the mollusks increase far more rapidly than that, some kinds laying as many as three hundred thousand eggs, and other kinds laying as many as six hundred thousand eggs! Some kinds are very careful to place their eggs

where they may be safe from harm, and where the young may find plenty to eat as soon as they are hatched. Some kinds lay eggs which are almost as large as those of a dove, and these kinds fasten leaves together to conceal the eggs. Some kinds lay their eggs in the ground; other kinds carry them about in the shell; and one kind — the Ocean Snail — fixes them to a floating raft,



as you see them in this picture, in which *a* is the raft, and *b* the eggs. Some kinds lay their eggs in long masses, called ribbons; and sometimes these ribbons are attached to the rocks or to sea-weeds. There are other kinds which carry their young about with them in a sort of pouch in the body, somewhat as the opossum carries its young in its pouch.

Some kinds of mollusks have a head, on each

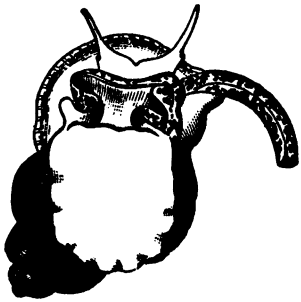
side of which is a large staring eye; a mouth with a stout beak or bill like that of a parrot; and from

A Head-footed Mollusk, or Cephalopod.

the head grow arms which these animals use in seizing their prey, and which they also use as legs in crawling from one place to another. These

animals are called the Head-footed Mollusks, or Cephalopods, a name which means that the animals have their feet attached to their head. They live in the sea, and are known as Argonauts, Cuttle-Fishes, Squids, and Nautili.

Other kinds of mollusks move or creep along upon the lower side of the body, which serves as

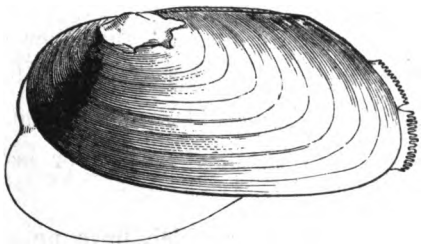


A Stomach-footed Mollusk, or Gasteropod.

a sort of foot; these are called the Stomach-footed Mollusks, or Gasteropods, — a name which means that the animals use the under side of the body as a foot. Some kinds live upon the land, others in ponds and rivers, and others in the sea.

There are other kinds of mollusks which seem to have no head, or, if they have a head, it is so

concealed within the body that they appear to be headless, and so these kinds are called the Head-



A Headless Mollusk, or Acephal.

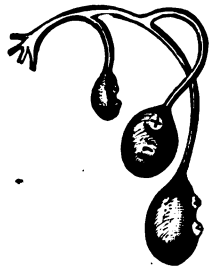
less Mollusks, or Acephals, — a name which means that the animals are without a true head.

An Arm-footed Mollusk, or Brachiopod.

Other kinds of mollusks are fixed by a stem to rocks or other objects in the sea; and they have around the mouth long fringed arms, by means of which they make currents in the water, and in this

way their food is brought to the mouth. On page twenty-one there is a picture of one of these mollusks, with one piece or valve of the shell taken away; one of its arms is coiled, the other is partly uncoiled. These are the Arm-footed Mollusks, or Brachiopods, — a name which means that the animals have organs which they use for both arms and feet.

There are other kinds which have no shell, but they are covered with a tough skin, or tunic; and



Tunic Mollusks, or Leather-bags.

these are the Tunicates, or Tunic Mollusks, or Leather-bags, as they are often called.

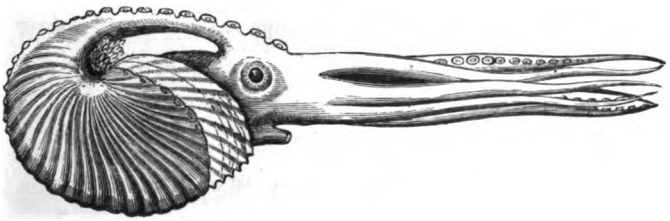
There are other kinds of mollusks which are very small, and which grow in clusters upon rocks, plants, and other objects in the water; these are

called Moss Mollusks, or Bryozoans, — a name which means that the animals look like clusters of mosses. They are also called Polyzoans, — a name which means many animals.

I will now tell you more about the different kinds of mollusks, and show you many pictures of them.

THE HEAD-FOOTED MOLLUSKS, OR CEPHALOPODS.

THE Argonaut, or Paper Sailor, has its home far away in the Pacific and Indian Oceans. It



The Argonaut, or Paper Sailor.

has a white, delicate, and very beautiful shell, two large eyes, and eight long arms, which are covered on the inner side with cup-shaped suckers,

by means of which it can cling tightly to anything which it takes hold of. Two of the arms are broad towards the end, and when the Argonaut swims, it turns these two arms backwards, and places their broad parts against the sides of the shell. The Argonaut crawls about on the bottom of the sea by means of its long arms, carrying its shell upon its back, or it swims, as you see it in the picture, by forcing the water out of the little tube which you see just under the eye.

For a long time it was believed that the Argonaut spreads its two broad arms, and uses them as sails, and that sitting in its shell as in a boat, it is thus wafted over the sea, like a ship. And so it was called the Sailor; and I think it was called the Paper Sailor because its beautiful white shell is almost as thin and delicate as paper.

It was believed that when the sea was calm, fleets of these mollusks might be seen sailing like little vessels over its surface, and that when the winds blew and the storms came, and the waves ran high, the Argonaut lowered its sails and withdrew them into the shell and then sank

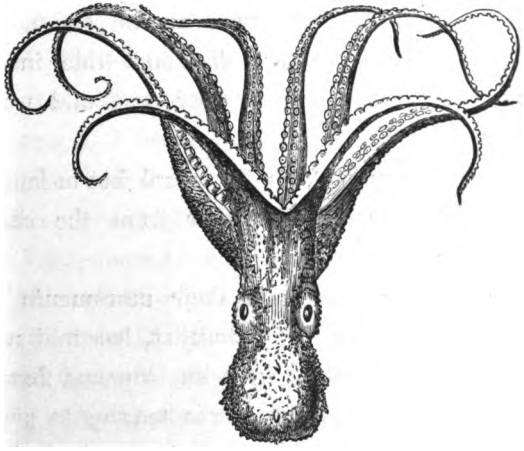
to the bottom of the ocean. This story was believed for many hundred years, even for several thousand years. Aristotle, who lived thousands of years ago in Greece, and who was a great naturalist and a great philosopher, and who was one of the first men who ever wrote books about animals, believed this story. Pliny, a naturalist who lived many hundred years ago in Rome, and who wrote books about animals, believed it. And the great Linnæus, and the great Cuvier, who wrote many large books about animals, and who have told us much of all we know about animals, believed this story. Everybody believed it, and it is in many books, and in beautiful poems. But at last a naturalist, — M. Sander Rang, — who carefully observed the Argonaut, and studied its habits, found out that it does not spread its broad arms, and thus sail over the sea, but that it moves through the water by swimming, and that it also crawls on the bottom of the sea, carrying its shell upon its back, as I have already told you. And so the pretty story about the sailing of the Argonaut was spoiled.

It was once believed that the Argonaut does

not own the shell in which it is found, but that, like the Hermit Crab, of which I have already told you, it lives in the shell of some other mollusk, which it has found, or which it has taken from its real owner by force; and so it has sometimes been called a thief and a pirate. The reason why it was believed that the shell is not its own, is because the animal is not attached to its shell as other mollusks are, and because the form of the animal is so different from that of the shell. But Madame Jeannette Power, and M. Sander Rang, have studied the Argonaut so carefully that it is now known positively that the shell which it lives in is really its own. It has been watched carefully from the time it hatches from the egg until it is full grown.

The Poulpe lives in the Mediterranean Sea and in the Pacific and Indian Oceans. It has a short round body, a large head, two great staring eyes, a stout and sharp beak, and eight long arms, each one of which is five or six times as long as the rest of the animal, and on these arms are about two thousand cup-shaped suckers, by means of which it clings so firmly to whatever it seizes

that it will suffer its arms to be torn off rather than to let go its hold. The reason it can hold so firmly is because it has the power of removing the air and thus making a vacuum under each



The Poulpe.

cup, and so the air presses on the cups and holds them tightly to whatever they rest upon; but the animal can also instantly destroy the vacuum under the cups, and thus at once release their hold. You will understand this when you are a little older.

The beak of the Poulpe looks like that of a parrot, and with this stout and sharp beak it tears in pieces and eats fishes, crabs, mollusks, and all other animals which it can seize with its long and terrible arms.

Most of the Poulpes live near the shore, and crawl about among the rocks, and hide in the clefts of the rocks, where they wait and watch for prey.

They vary from an inch to several feet in length. The largest kinds live farther from the shore, even in the open sea.

Their sight is keen, and their movements are quick. Mr. Broderip, the naturalist, has told us of one that he saw floating with its long and flexible arms around a fish which it was tearing to pieces with its sharp bill. He tried to catch it in a net; but as soon as the net was brought close to the Poulpe, it instantly unloosed its suckers and its arms, darkened the water with an inky fluid which it ejected, and then quickly went out of sight.

The Poulpes have a wonderful power of changing their color, and it is said that they vary their

hues according to the nature of the ground over which they pass, and the color of the water in which they are. When in deep water they are generally of a brownish-purple color; but when in shallow water they are yellowish-green. They also change their color and appearance when excited or disturbed, the hues and the condition of their skin varying with the nature of their feelings. If you could see a poulpe lying quietly in a pool of water, where it has been left by the tide, you would see that it is quite smooth and of rather a pale color; but try to catch it, and it quickly becomes darker in color, and in an instant the surface of the body becomes covered with warts, which remain there till the poulpe becomes perfectly quiet again.

Poulpes are caught and kept for sale in the markets of Naples and Smyrna, and in the bazaars of India; for the people in Eastern countries use them for food.

The Squid, or Loligo, or Calamary, has a long body, short and broad fins at the end of the body, a great eye on each side of the head, and ten arms, two of which are longer than the others,

and the arms have suckers very much like those of the argonaut and the poulpe. The Squid has

The Squid.

no shell on the outside, but within its body it has a horny substance which is called the "pen," because its shape is much like that of the quill-pen which many persons use in writing.

Squids crawl on the bottom of the sea by means of their arms, with the head downward. They swim backwards, and with great swiftness, darting through the water with the velocity of an arrow; they often even throw themselves out of the water on to the shore, and sometimes on to the deck of a vessel. Squids live together in large shoals, and come near the shore to lay their eggs. Each one lays about forty thousand eggs, and these are joined together in a cluster; a single cluster is sometimes a foot across, and it looks much like a large jelly-fish.

Squids are much used for bait in fishing for the cod, and sometimes as many as four or five hundred vessels are engaged in catching squids, to be used in the cod-fisheries.

All of the head-footed mollusks of which I have already told you are often called Cuttle-Fishes, because they are very much like the true Cuttle-Fishes, of which I am now going to tell you.

The true Cuttle-Fish has a shorter and broader body than the squid, and on each side of the body there is a narrow fin which extends the whole length; and instead of a horny pen, it has within

its body a broad limestone substance called the "cuttle-bone." You have often seen it, for it is this bone that you buy at the bird-store for your canary.

Cuttle-Fishes live in almost every sea; they are very abundant in the Mediterranean, and it is on the shores of this sea that the cuttle-bones are gathered which are sold in the shops. They lie on the shore in long ridges, where they have been heaped up by the waves.

The Cuttle-Fishes are much used for food, especially by poor people who live on or near the sea-coast. The fishermen often catch them at night. They go out in boats, carrying bright torches so that they can see down into the water, and when they see a cuttle-fish they quickly secure it with a sharp spear.

Some kinds of cuttle-fishes are very small, only a few inches in length, and some kinds are two or three feet long. Their colors are generally reddish or purplish, but vary greatly.

The Cuttle-Fishes are hungry creatures, and eat all kinds of animals which they can catch. They attach their eggs in clusters to sea-weeds and other

objects in the sea, and the clusters look somewhat like bunches of grapes, and they are sometimes called Sea-Raisins.

Here is the picture of a little animal which is somewhat like those of which I have been telling you. It lives in the warm parts of the ocean,

The Spirula.

and it is called Spirula, from the little spirally coiled shell within its body. These pretty little shells are often carried along by the ocean currents and waves, and thrown upon the shore of the sea; but the little animal itself is not often seen. The

shell is white and delicate, and so thin and clear that you can almost see through it; it is divided across into many little pearly chambers.

All of the head-footed mollusks of which I have now told you — the Argonaut, the Poulpe, the Squid, the true Cuttle-Fishes, and the Spirula — have within their body a bag of liquid almost as dark as ink. This liquid is, in fact, called ink, and the bag which contains it is called the ink-bag. When these animals are alarmed or disturbed, they discharge some of this ink into the water, which makes it cloudy and dark to the distance of many feet; and they then dart away and hide in the darkness which they have made. Many hundred years ago the ink obtained from the Cuttle-Fishes was used for writing, and it was once used in making sepia, a substance used by artists in painting. Sepia and India ink are now made of charcoal.

Cuttle-Fishes that lived thousands and thousands of years ago have been found imbedded in the rocks; the rocks in which they are were once the muddy bottom of the sea in which these animals then lived. Even the ink-bag has been preserved in the rocks, and the ink itself, although dry and

hard, makes good sepia for painting, when mixed with water. A naturalist — Dr. Buckland, I believe — once made a painting of one of the old cuttle-fishes which lived and died so long ago, and, what is very curious, the sepia which he used in painting it was made from the dry, hard ink of the fossil cuttle-fish itself!

In many parts of the world, and in some parts of our country, especially in New Jersey and Texas, there are found in the rocks hard, straight, and more or less pointed bodies which are about as long and as large as a man's finger; some kinds of them are larger than this, and some kinds are smaller. Many persons who found them used to call them thunder-bolts; for they thought that they were formed or sent down from the sky by the lightning and the thunder. But ever since men have studied the Cuttle-Fishes and the Squids they have known that these hard, straight, and pointed bodies are the remains of animals which used to live in an old ocean, and which were very much like the Squids and Cuttle-Fishes that are now living. It is now known that each one of these bodies was formed in a squid-like animal,

or an animal much like a cuttle-fish, just as the "pen" and the "cuttle-bone" are formed in these animals now.

There are Cuttle-Fishes much larger than any of those of which I have told you. Some have been caught which were as long as a man, and even longer, and I have read of one which it is said was many times as long as a man; it was seen in the Atlantic Ocean by the officers of the French steamship Alecton. They first tried to kill it by shooting it, but failed; they then tried to harpoon it, but could not catch it in this way; they then threw a lasso or rope around the hind part of its body, and began to haul it on board of the vessel, but the huge cuttle-fish broke in two, and so they secured only the hind part of the body, — the main body, head, and arms being left in the sea. The crew of the vessel wanted to launch a boat and pursue the cuttle-fish, but the commander of the steamship would not allow them to do so, fearing that the huge monster would capsize the boat and destroy the men!

One of the large kinds of cuttle-fishes can grasp a man so tightly that he cannot get away, and one

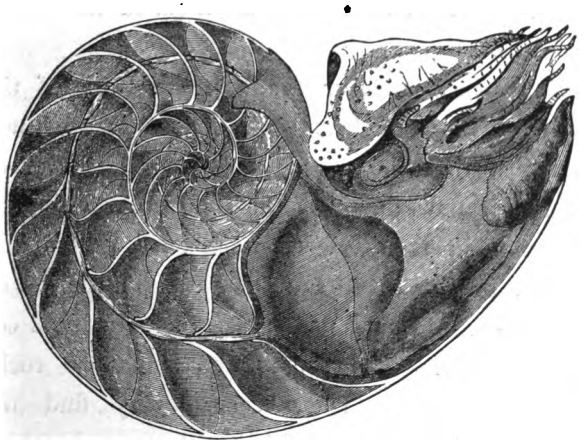
of the largest kinds can easily kill a man. I have read the following story about a Mr. Beale and a cuttle-fish, and I will tell it to you.

Mr. Beale was searching for shells among the rocks in Bonin Island, and there found a very queer-looking animal crawling back towards the water which it had just left. It was creeping on its eight long arms, and was much alarmed and tried hard to get away from where Mr. Beale was. He tried to stop it by putting his foot on one of its arms, but he could not stop it in this way. He then grasped one of its arms with his hand; the animal at first tried hard to get away, but soon afterward sprang towards Mr. Beale's bare arm, and, seizing it, clung firmly to it with its long arms and powerful suckers, and at the same time got ready to bite him with its sharp beak. Mr. Beale felt chilly and sick while his arm was in the cold slimy grasp of the huge cuttle-fish, and he called loudly to his companions for help; they came and killed the cuttle with a boat-knife, and then they unloosed the long arms from their powerful grasp.

You have seen the beautiful Nautilus shells

which sailors and travellers bring home when they return from their long voyages over the seas. The Nautilus does not live in the ocean near our country, but it lives far away in the Pacific and Indian Oceans. Its shell is not only beautiful, but it is also very curious, — much more curious than you think it is, if you have only seen the outside of it; for it is divided into many rooms or chambers. On the next page there is a picture of the Nautilus cut open so that you may see the chambers. The animal lives in the outer one, but it has in turn lived in every one of the chambers, — moving forward from time to time, and forming a partition behind itself as often as it has moved forward, so that the number of chambers shows the number of times the animal has moved. From the last chamber, where the animal lives, there runs a tube, called the siphuncle, through the centre of all the partitions, even through the smallest or first-formed one, as you may see by the picture. Instead of having a few strong arms covered with suckers, like those of the other head-footed mollusks, of which I have already told you, it has a great many arms, or tentacles, as they

are called. It has two large eyes, each upon a stem or stalk, and, like the other head-footed mollusks, it has a stout parrot-like beak. The Nautilus has no ink-bag nor ink with which it can darken the water, so as to hide when danger is near;



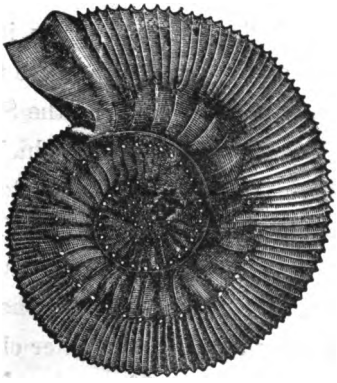
The Nautilus, cut open.

but it has a strong hood, and when it is alarmed it draws itself back into its shell, and then the opening to the shell is closed by this hood as by a door. The Nautilus swims with its head and tentacles extended beyond the shell. It crawls along the bottom of the sea by means of its tentacles, carrying its shell upon its back.

The people on some of the sea-coasts use the Nautilus for food; they salt it and dry it in large quantities. Its shell is often beautifully engraved and used for vases and drinking-cups. The inside of the Nautilus shell is very beautiful, looking like pearl, and so it is often called the Pearly Nautilus.

You will remember reading the story of the Trilobite in your little book of Insects. I there told you that the ocean was once much larger than it is now, and that the solid rocks on which we walk in many places were once the muddy bottom of the old ocean, and that in some way they have been hardened into stone, and lifted out of the water. The people who study the rocks know this to be true, because they find the rocks, in many places, filled with animals which once lived in the ocean. When these animals died, they were covered by sand and mud, and when the sand and mud hardened into stone, these animals turned into stone also; and now by studying these fossil animals, men learn much about the earth as it was many thousand years before any man lived upon it.

The Ammonite is one of the animals which lived in the ocean long ago, but which is not living now. Its shell is formed much like that of the Nautilus, and it has many chambers. Hundreds of kinds of ammonites have been found in the



The Ammonite.

rocks; some kinds are no larger than a penny, and others are more than a yard across. Some kinds of ammonites are very beautiful; as you look upon the surface of the shell, you see the most delicate tracery, often resembling leaves and ferns; these beautiful markings are the edges of the walls which separate the chambers; the

walls in the Ammonite shells do not run straight across, but are beautifully bent, waved and folded.

In the rocks, in many parts of our country, you may see long straight and chambered shells, which look very much as an ammonite would if it were uncoiled, and drawn out straight. Some kinds of these straight shells are only a few inches long; other kinds are a foot long; others are two or three feet long; and in some parts of the State of New York, straight chambered shells which are more than ten feet long and a foot in diameter have been dug from the solid limestone rocks! The animals that owned these shells were very much like the Nautilus that lives in the Nautilus-shell, and like that mollusk they lived in the outer chamber, and there was a tube which ran from the animal to the very farthest or first formed chamber, as in the Nautilus. These straight-shelled animals lived when the ocean covered all the parts of our country where their shells are now found, — and that was many hundred thousand years ago. As they moved about on the bottom of the old ocean they carried their shell upon their back, — the shell I suppose standing up straight in the water. Nor

was their shell heavy for them to carry, as you may think it was from seeing these animals as they are dug from the rocks. They are now turned to stone, and so are very heavy, but when they were alive in the ocean they were light, and were very much like the Nautilus-shell; and the chambers were filled with air, which helped to float the shell, and thus make it easy for the animal to carry it. You may like to remember that these old straight-shelled mollusks are called Orthoceratites, a name which means straight horns.

THE STOMACH-FOOTED MOLLUSKS, OR GASTEROPODS.

THERE are many thousand kinds of these mollusks. They are abundant in the sea, in lakes, ponds, rivers, and brooks, and on the land. Nearly all kinds have a shell, and as the shell is made of only one piece, or valve, they are also called Univalves, which means that they have only one piece in their shell. Some kinds have no shell when they are full-grown, but all have a shell when

they are very young. They have a head, two, four, or six feelers or tentacles, — little organs which you sometimes call horns, — on two of which the eyes are said to be placed, and many of them have hard horny jaws and a long tongue.

The tongue of the Univalve Mollusks is called a ribbon, because it is long and flat like a band or ribbon; it is very small, but may be seen by means of a microscope, even in the little univalves that are no larger than a pea, or an apple-seed, or a pin-head. And the small ones have the tongue just as perfectly formed as the large ones. Naturalists have carefully examined their tongues under the microscope, and have even counted their teeth! For you must know that nearly all of the Univalves have their teeth upon the tongue. The teeth are in rows, and on one tongue there have been found one hundred and sixty rows of teeth, and one hundred and eighty teeth in each row, — more than twenty-eight thousand in all! Think of that, little people, who have only twenty teeth.

Many of these mollusks feed upon plants, but some kinds feed upon animals. Some kinds feed upon living animals; others upon dead ones. The

kinds that feed upon living mollusks often attack those that are much larger than themselves, although the large ones may be tightly shut within their shell. You will like to know how they can get at the animal within its hard shell, and I will tell you. It is by means of the wonderful tongue of which you have just been reading. The tongue, with its many little hard teeth, acts like a rasp, and with it the gasteropod files a neat little round hole through the hard shell of the animal which it wants to eat, and then sucks out the soft parts of the animal through the hole thus made.

You will like to know how the shells of univalves and other mollusks increase in size, and what gives them their curious forms and their beautiful colors; but before I tell you this, you must first know that all the mollusks, whether they have a shell or not, have the soft body covered by an elastic skin, which, in almost every kind, extends around the little animal and envelops it like a mantle or cloak, and so this skin has been named the mantle. Those mollusks which have no hard shell to protect their soft parts have a thick mantle, but those which have a shell to cover

them have the mantle thin and often transparent. In some kinds of mollusks — those kinds which have the shell in two pieces, or valves — the mantle is like two large veils which cover and conceal the animal; in the Univalves it encloses the animal like a sac. In the mantle there are openings so that water may flow in and out; the water that flows in carries in air that makes the blood pure, and, when the mouth of the mollusk cannot be pushed out beyond the mantle, the current of water which flows in also carries in many floating particles of food, to nourish the little animal and keep it alive. There is also an opening in the mantle of many mollusks through which the foot of the animal is pushed forth.

It is this mantle which surrounds the mollusk that gives the shell its shape and its colors, for the shell is formed by the mantle; and it is from the edge of the mantle that the shell increases in size, and from the outer surface of the mantle that the shell increases in thickness; I will tell you more about this. When the shell is growing the edge of the mantle is pushed forth, and is firmly joined to the edge of the shell, and

then the little particles of soft shelly matter, which are formed in the edge of the mantle, are deposited upon the outer edge of the shell, where they soon harden, and in this way the shell grows larger. The little particles which are formed in the outer surface of the mantle are deposited upon the inside of the shell in layers, and in this way the shell grows thicker.

In the edge or border of the mantle of many kinds of mollusks little colored spots may be seen; these spots have been found to be little glands which contain a coloring matter; and it is the coloring matter in these little glands that gives to the outside of shells their beautiful hues and tints. The surface of the mantle has no color-glands, and so the inside of the shell is white.

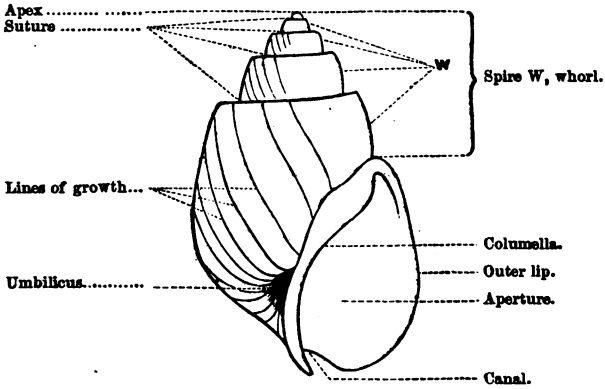
But the colors of shells depend greatly upon the light which falls upon the animals; and the shells which live in shallow and clear waters have colors much more brilliant than are those of the shells which live in deep dark waters, and those mollusks which are fixed to one spot in the sea for life often have the upper part of the shell richly tinted with bright colors, while the lower

part of the shell is colorless. And the shell is also colorless in those mollusks in which it is concealed in the mantle.

You will remember that I have told you that some of the mollusks have a little lid, or door, which closes the opening to the shell when the animal has withdrawn into it, and so tightly shuts him in, that he is safe from harm; the mollusks which have this little lid, or operculum, as it is called, are univalves. The lid is attached to the foot of the animal, and in some kinds it is thin and horny; in other kinds it is thick and shell-like. These little lids are often found upon the sea-shore; for after the animals die the lids become detached, and are thrown upon the shore by the waves. The operculums of some of the univalves have often been of use to man. The eye-stone which you have often seen, and which is used to remove cinders, or other little particles that have lodged upon the ball of the eye, is the operculum of a little mollusk.

But you must not think that all of the univalve mollusks can thus shut themselves closely in their shell, for there are many kinds which have no little door upon the foot.

Some kinds of univalves, as the Land-Snails, breathe air, and are called Air-Breathers; others, like the Sea-Snails, and the River-Snails, breathe



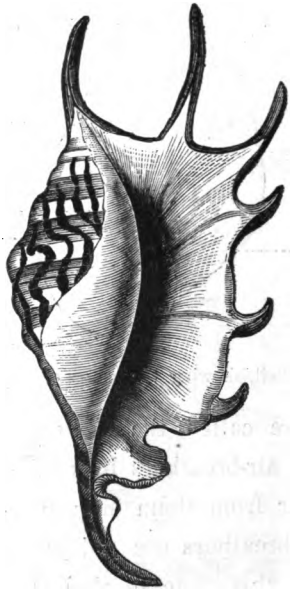
A Univalve Shell, showing the names of its different parts.

water, and are called the Water-Breathers. The young of the air-breathers look like their parents, and they differ from them only in size; the young of the water-breathers are unlike their parents in looks, and at this time of their life they do not creep about, but swim by means of a pair of little fins which grow out from the sides of the head.

But before I tell you about the different kinds, you may look at this picture of a univalve shell,

and read the names of its different parts, and if you cannot remember them now, you will, perhaps, be very glad to learn them when you are older.

Here is the picture of a curious shell, which is

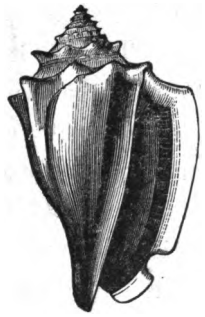


The Scorpion-Shell.

found in the seas near the countries of India and China. The real shell is much larger than this picture; it is nearly as large as this book. You

see what long horns or spines it has; from these it gets the name of Sea-Spider or Scorpion-Shell. But it does not have these claws when it is young; they grow out as the animal grows to its full size. The Scorpion-Shell is very pretty; the inside is of a delicate pink color. This shell is also called the Pterocera, — a name which means horn-winged.

The Stromb, or Conch-Shell, whose picture you see here, is found in the sea at the West India



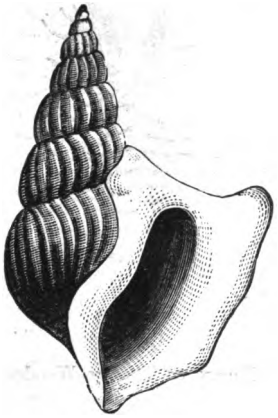
The Stromb, or Conch-Shell.

Islands. There are many kinds of Strombs, and most of them live in the warm parts of the ocean. They have large eyes on stout eye-stalks, slender tentacles, and their "foot" is narrow, so that they

cannot creep well, but they move along by taking short leaps, their heavy shell turning from side to side. Their eyes are better than those of other univalves or gasteropods, and are as good as those of many kinds of fishes. The Strombs do not attack living animals, but they feed on dead animals which they find in the sea, and so they are often called carrion-feeders. Some kinds of these mollusks are very large; one kind is called the Fountain-Shell, and weighs four or five pounds. The Stromb-Shells are collected in great numbers, and used in many ways. Thousands and thousands of them are cut up to make the beautiful shell cameos which are worn as ornaments, and thousands and thousands are ground up and used for making porcelain. But I must tell you that a true cameo is made of stone, — of a variety of agate called onyx. You can tell an onyx cameo from a shell cameo, because the stone one is very hard, and you cannot scratch it with the point of a knife, while the shell cameo is soft, and you can easily scratch it. Stromb-Shells are often used for ornaments in the study and in the parlor, for they are very beautiful, the inner side of the shell being of the softest and richest

rose color. The name Stromb, as you may like to know, means a top; the shell, as you may see in the picture, is shaped a little like a top.

The Spout-Shell is found on the coast of New

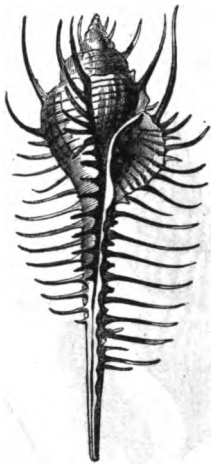


The Spout-Shell.

England. It has a long spire, many whorls, and a broad lip; one kind has the outer lip in the form of the webbed foot of the pelican, — a swimming bird, — and so it is named the Pelican's Foot.

The Scorpion-Shell, the Stromb, and the Spout-Shell are often called Wing-Shells, because their broad lip is spread out somewhat like a wing.

Here is a picture of the Murex, one of the Rock-Shells; this one is often called the Thorny Wood-



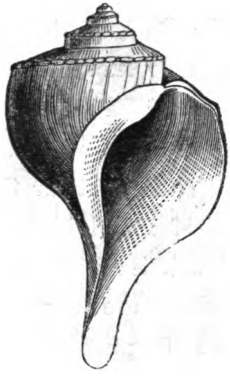
The Murex, or Thorny Woodcock.

cock. You have seen a picture of the woodcock in your little book about Birds, and you remember the long bill it has; I think this shell gets its name from the long slender part which looks a little like the woodcock's bill; and it is called thorny from the many spines which grow upon the shell. There are many kinds of the Rock-Shells, and some kinds are found on the shores of almost every warm sea and ocean. The Thorny Woodcock is

brought from the Molucca Islands. Instead of spines, some kinds have outgrowths which look a little like leaves with beautiful frilled and ruffled edges.

It was from the Rock-Shell mollusks that the people, who lived many hundred years ago in Tyre, obtained a most beautiful purple dye called the Tyrian purple. Travellers who have visited Tyre have found on the shore, not far from the ruins of the city, a number of round holes cut in the solid rock. Some of these holes are no larger than a common iron kettle, others are very much larger; and within these were fragments of shells, and on the beach were heaps of broken shells. It is believed that the smaller shells were pounded and crushed in these stone mortars, in order to obtain the liquid which would make the beautiful purple color. The dyeing material is contained in a little cream-colored sac which runs across the body of the Murex, and it is said that the best dye was obtained by carefully taking it from each little animal. The Tyrian purple was very costly, and garments dyed with it were worn only by princes and very rich men.

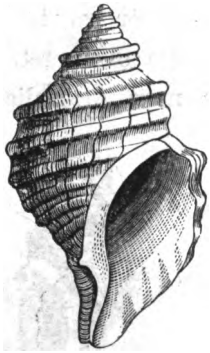
This shell is found on the coast of our country, and the real shell is much larger than this picture; it is about as long as this book. It is



The Pyrula.

named from its form, which, as you see, is like that of a pear; so it is called Pyrula, a word which means a little pear. It is also called the Fig-Shell. You will sometimes find the eggs of the Pyrula upon the beach. They look like a long chain of little bags. In each bag are many young pyrulas, each having a perfectly formed little shell; and in each bag there is a small opening, through which the young may escape into the water.

The Fusus, or Spindle-Shell, looks a little like the Pyrula ; several beautiful kinds of this shell are found on our own coasts, and here is a picture



The Fusus, or Spindle-Shell.

of one of them. The Spindle-Shell mollusks live in deep water. The best time to look for them is soon after a storm, for during a storm they are thrown upon the beach by the dashing waves. One kind, called the Red-Whelk in England, and the Buckie in Scotland, is caught in great numbers, when alive, and sold in the markets, for the people in those countries like it for food. Its shell is often called the Roaring Buckie, because

a sound like the roaring of the sea may always be heard in it when you put it to your ear. The people who live in Zetland use this shell for a lamp; they put the oil in the large cavity, and the wick in the tube or canal.

Here is the picture of a pretty shell which is found in the sea near Australia, a large island

The Frog-Shell, or Ranella.

in the Pacific Ocean. It is called the Ranella, or Frog-Shell. The name Ranella means a little frog.

There are as many as fifty kinds of the Frog-Shells, and all of them live in the warm waters of the tropical regions.

Most of the Triton mollusks are found in the warm seas. There are many kinds of them, and some kinds are very large. One large kind of Triton

is used by the people who live on the islands in the Pacific Ocean as a speaking-trumpet. The

The Triton.

little Triton-Shell whose picture I here show you is found on the sea-shore of New England.

The Buccinum, or Whelk.

Here is the picture of a Buccinum, or Whelk, as it looks when it is crawling up the glass side of an aquarium; the broad white portion is the

foot upon which the animal crawls or creeps along. You can see a little black dot at the base of each feeler or tentacle; those dots show you where the eyes of the Whelk are placed; the long snout which you see at one side encloses a tongue which is furnished with sharp teeth, and by means of these teeth the Whelk can bore into the hardest shells and get the soft parts of the animals, upon which it feeds. This long snout, like that of the elephant, can be bent in all directions. The eggs of the Whelk are enclosed in clusters of little cup-shaped sacs, which are piled upon one another in such a manner that the mass looks somewhat like a short ear of corn. Each sac contains five or six eggs; and the little whelks escape into the water through a small round hole in the side of the sac.

Many persons like to eat whelks, and large numbers of these mollusks are caught and sold in the markets. They are sometimes caught by means of a heavy net, which is dragged along upon the bottom of the sea, but they are usually taken in baskets; the baskets are baited with pieces of fishes, and are then lowered by ropes to the bottom of the sea; the hungry whelks find the baited

baskets and crowd into them by hundreds; when the baskets are heavy with whelks they are drawn to the top of the water and emptied, and are then baited again, and again lowered into the sea.

You remember, Amy, the pretty little shells which we found last summer at Nahant, clinging to the rocks and sea-weeds. In some places they almost covered the rocks, and we could hardly step without crushing some of them under our feet. Some were white, some were of a rich brown color, some were orange-colored, and others were striped and banded with different colors. The name of these shells is Purpura, or Purple-Shells. They are found on all rocky shores. The little animals are very hungry creatures, and they feast upon other mollusks, which they destroy by drilling through their shell, and then they suck out the soft parts through the hole which they have made.

The Purpuras like to feed upon the sea-mussels, — these are mollusks which have the shell in two pieces, like that of the oyster and the clam, and which are attached to the rocks and to sea-weeds by the little silken threads which they spin from

their body, — and it is said that it takes the Purpura not less than two days to drill, with its little rasp-like tongue, a hole through the shell of the mussel.

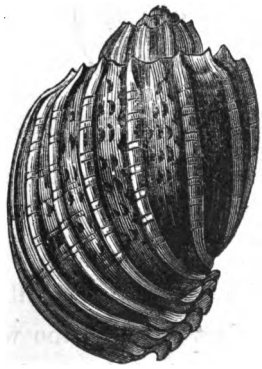
The eggs of the Purple-Shells are enclosed in very small oval cases, or pods, of a yellowish color, which are attached in clusters to the rocks. In each little case there are twenty or thirty young purpuras, and when the little animals are ready to crawl about they eat their way out of the case.

There are nearly one hundred and fifty kinds of these mollusks, and they are often called the Cockles; they are called the Purpuras because many of them give out, when crushed, a fluid which stains a purple, or a dull crimson color. It is said that the sac which contains the coloring matter extends across the head and neck of the little mollusk, and that if you press upon the lid which shuts the animal in its shell, the color-sac is broken, and your finger is stained with the crimson dye. The color is first yellow, then light green, then dark green, then violet, and then a reddish-purple.

The curious little shell, whose picture you see upon the next page, is found in the sea on

The Ricinula.

the coast of China. It is the Ricinula, a name which comes from the name of the fruit of the castor-oil plant.



The Harp-Shell.

The Harp-Shell is very beautiful, both in form and colors. It is named the Harp-Shell because it looks a little like a harp. The colors are mostly

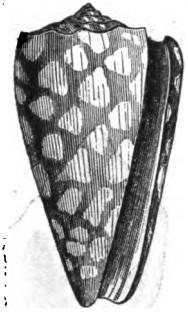
delicate shades of pink and brown. Harp-Shells are found in the warm parts of the ocean, and usually in the deep water. The picture is only one half as large as the real shell.

The Olive-Shell.

There are more than a hundred kinds of the Olive-Shells, and they are among the most beautiful of all shells. They live in the warm parts of the ocean. The Olive-Shell mollusks are very active, and can dart through the water quite fast by spreading out and flapping their large foot. They like to dig and burrow in the sand in search of other mollusks, upon which they feed. They are very hungry creatures, and are often caught with lines and hooks baited with flesh. The

shells have a beautiful lustre, and they are very prettily lined and marked. From their form they are named the Rice-Shells.

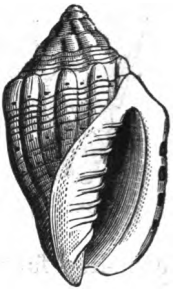
The Cones are among the rarest, costliest, and most beautiful of all the shells. They get their



A Cone-Shell.

name from their cone-like form. There are more than two hundred and fifty kinds of these lovely shells, and nearly all of them have their home in the tropical seas. They live in holes and crevices in the rocks, and in the warm waters inside the coral-reefs, and move about slowly. They are very hungry creatures, and they feed upon other little sea-animals; they are quite savage, too, and sometimes bite the hands of those who capture them.

When the animal is alive, the beautiful and brilliant colors of the shell are hidden by a thick rough skin. The Cones have very pretty names. The one whose picture I have shown you is called the Marbled Cone. It is found on the coast of China. Another beautiful cone is named the Golden-Drop. Another, perhaps the most beautiful of all, is called the Glory of the Sea.



The Volute.

In the warm seas there are found many pretty shells called the Volutes, from a word which means to turn or roll. Here is a picture of one which is found in the sea at the West India Islands; it is twice as large as the picture, and, from the lines and dots upon the shell, it is named the musical Volute.

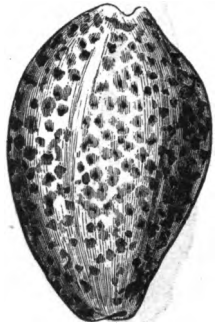
The Mitre-Shell, whose picture you see here, is from the coast of Ceylon. Its color is pure shining white, spotted with red. There are several hundred kinds of mitre-shells, and the largest and most beautiful kinds are found in the Pacific and Indian Oceans, and in the Red and Mediterranean Seas.

The Marginella.

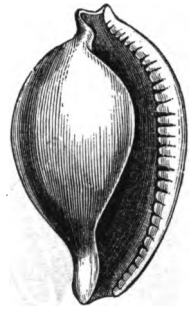
The Mitre-Shell.

The Marginellas live in the warm parts of the ocean, and are named from the rim or margin of the full-grown shells. The one whose picture is upon this page comes from the coast of Africa. There are nearly one hundred kinds of the Marginellas; their shells are smooth, and have a shining lustre, and are very beautiful.

The Cowries, or Porcelain-Shells, are found only in the warm parts of the ocean. They have a smooth, enamelled shell, which in most cases is very beautifully ornamented with spots or lines. You have seen these shells, for they are often brought home from the sea by travellers, and they are sometimes placed in the study and parlor for ornaments.



The Cowry.



The Egg Cowry.

Here is a picture of one of the spotted kinds, and also a picture of the Egg Cowry which is found on the coast of New Guinea.

The Cowries are found on coral reefs, for they like to feed upon coral animals; they are also found under the rocks and reefs when the tide is low.

The natives on the islands of the sea adorn their dress with Cowry shells. One kind, the Orange-colored Cowry, is worn only by those of the highest rank. They use one kind as weights for their fishing-nets, and one kind, the Money Cowry, is used instead of money by the natives of Western Africa. Many tons of this kind are collected around the Islands of the Pacific and Indian Oceans, and carried to England, and from there to Africa, where they are used in trading with the negroes.

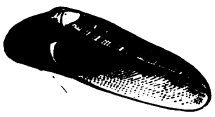
Here are pictures of a little cowry found on the coast of Europe.

The European Cowry.

All the cowries have a broad foot and a wide mantle which spreads over the shell, and almost wholly conceals it; the light-colored line which you see upon the back of the cowry-shell shows you where the mantle-lobes meet. The shape of the young cowry-shell is very different from that of the full-grown shell; when young the cowry-shell is

thin, has a spire, and is shaped much like the Olive-shells.

The Naticas are sea-snails, which are found on almost every coast, and they are very interesting little creatures. Their foot is very large, and in front it is doubled into the form of a wedge, and serves as a sort of plough. If you walk along the beach, when the tide is low, you may perhaps see some of the Naticas ploughing their way through the sand. There are many different kinds, and



The Natica.

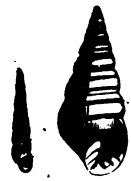
The Natica.

several kinds are found upon our coast. They feed upon other mollusks, into whose hard shells they drill a smooth round hole with their ribbon-shaped tongue, armed with hard teeth.

The eggs of the Naticas are very curious. When walking on the long sandy beach at Lynn, Massachusetts, and on other sandy beaches, you will often see a broad band curled into the shape of a saucer,

and which seems to be wholly made of sand. This is really a cluster of Natica eggs; and if you will hold the saucer-shaped band up before your eyes, and try to look through it, you will see that the band is not all sand, but is filled with little eggs.

Pyramid-Shells are so named from their shape, which is a little like that of a pyramid. Most kinds are found in the warm parts of the ocean. The larger is the picture of one which is found in the sea near the West Indies, and the other is found on the coast of Europe.



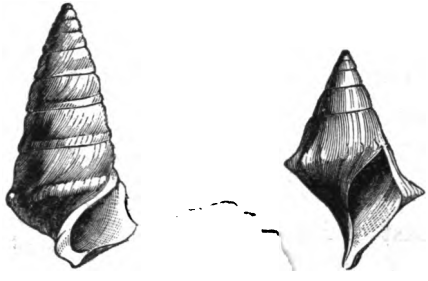
The Pyramid-Shells.

The Cerithium.

The Cerithium is named from a word which

means a small horn. There are many kinds of this gasteropod, — more than a hundred. The one whose picture I here show you is from the Moluccas.

Here is the picture of a shell which is found in the lakes and rivers of the Western and Southern



The Melania. The Io.

States. It is called Melania, a name which means blackness. The shells are covered with a thick, dark skin, and often with mud, for they seem to like to live in muddy places.

The Io is a shell which is found in the rivers and streams of the Southern States.

But you must not think that these two are the only kinds of shells which you may find in the streams in the Southern and Western parts of our country; there are also very many other kinds.

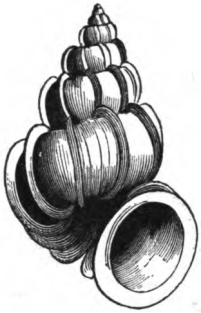
This long tapering sea-shell is called Turritella, a name which means a little tower. There are more than fifty kinds of the Tower-Shells. They are sometimes called Screw-Shells. They move about rather slowly, and often remain in the mud at the bottom of the water.

The Tower-Shell.

The Worm-Shell.

The Worm-Shell is found in many parts of the ocean. When young, it is free to move about, but after a time it lies down in a safe place, fixes itself to some object, and keeps on growing, the shell twisting irregularly. Some kinds of the Worm-Shells live in groups, and are often twisted together

in large masses, even so as to form reefs. Some attach themselves to coral, and lengthen their shell as the coral grows upward. As the shell grows longer, the animal leaves the lower part of it, — the spire, — so as to keep at the opening of its tube, and then makes a partition, or wall, behind itself, in about the same way as the nautilus makes its walls, and in a large and long worm-shell many of these walls are sometimes found.



The Wentle-trap.

Here is a picture of a beautiful shell which is found in the Chinese seas. The whorls of the shell are not closely united, and around them, from the mouth of the shell to its tip, are ribs or rings; and from these spirally-placed rings it is

called the Wentle-trap, a name which means winding stairs. It is also called the Royal Stair-case Shell, and the Precious Wentle-trap. Its true name is Scalaria, which means ladder-like. The color of this shell is pure shining white; the shell itself is rather thin, and is partly transparent, but the rings are so thick that the light does not pass through them, and they are as white as snow. It was once a very rare and costly shell, and one has been sold for more than four hundred dollars. The live Wentle-trap lives mostly in deep waters, but it is sometimes found in shallow places. When the animal is alarmed or disturbed a dark purple liquid flows out of its body.

There are very many kinds of Wentle-traps, — nearly one hundred, — and the most beautiful kinds are found in the warm seas; the Precious Wentle-trap of China is the most beautiful of all. Some kinds are worn by the Spaniards as ear-rings.

The Periwinkles, or Litorinas, are little univalves that live on the sea-shores of almost every part of the world. They feed upon sea-weeds. Some kinds live at low water; others at high water; and others where they are never covered by the water,

except when the waves dash over them. Some kinds crawl up the trees near the shore, and some kinds have been found on trees at a distance from the sea. Many kinds of birds feed upon these little mollusks, and some kinds are eaten by men. Periwinkles crawl about slowly, and often remain a long time in one spot, so that sea-weeds sometimes grow upon their shells. The Periwinkles are very useful in the aquarium, for they eat the minute

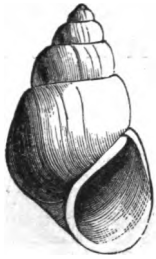
The Litorina, or Periwinkle.

Lacuna.

plants which often grow upon the sides of the tank, making the glass dim and the water impure. The Periwinkle crawls up the side and cuts down these little plants with its tongue, which is armed with rows of little teeth. The tongue of the Periwinkle is two inches long. The foot is divided lengthwise into two parts, so that, in walking, first one side advances, then the other. The Lacuna is named from a slit in the shell; the word Lacuna means fissure; and the word Litorina means sea-shore animal.

The little Valvatas are found in lakes, rivers, and ditches. Sometimes the shell is flat, sometimes it is slightly raised, and it has a little round mouth. When the animal is walking its little gill is seen on one side, looking somewhat like a slender leaf.

The Valvata.



The Paludina.

Here is a picture of the shell of one of the river snails. These mollusks crawl slowly, and often stay in the soft mud at the bottom of rivers and deep ditches; they feed on decaying animals and plants.

The Nerite is found in the warm parts of the ocean; the shell is thick and almost globe-shaped.

The Nerite.

The Fresh-water Nerite.

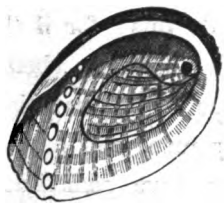
The Fresh-water Nerite is small, almost globe-shaped, and ornamented with dark bands and spots. It is found in the rivers of the warm regions.

The Trochus.

This is a picture of one of the Top-Shells. Its name is Trochus, which means a hoop. Both the shell and the animal are very beautiful. This one is found on the coast of Europe. The young hermit-crabs like to live in these shells. One kind, living in the seas near the West Indies, has a very thin brittle shell, and the animal has the

habit of gluing to its shell bits of stone, small pieces of coral, and shells, perhaps to strengthen it. One kind, found on the coast of India, has a long spire of a silver and golden color.

The Top-Shells have a very beautiful, pearly lustre, and the smaller kinds are very much used as ornaments; they are carefully polished, and are then strung together and made into bracelets and necklaces, and they are sometimes used in trimming hats and dresses.



The Ear-Shell, or Haliotis.

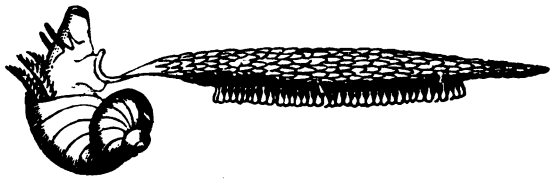
The Ear-Shell is so named because its form is a little like that of an ear. There are many kinds of this shell; most of them are found in the warm parts of the ocean. The shells are very beautiful; when polished they have a shining, pearly lustre, and all the colors of the rainbow. They are

highly prized as ornaments, and are much used in ornamenting boxes, writing-desks, and other useful articles; they are also used in making beautiful pearl buttons; and very handsome sleeve-buttons are cut from these shells. When alive the Ear-Shells attach themselves to the rocks by means of their large, broad foot, and their hold is so firm that it is very difficult to remove them. Sometimes men who are collecting these shells place their fingers under the edge, which is often a little raised from the rock, when the animal is not disturbed, but it is dangerous to do this; for if the animal is not removed, it draws down its shell with such force that it grasps securely whatever is under the edge, and in this way men who have tried to do this under the water have sometimes been held so firmly that they have been drowned.

In Japan and in some other countries the Haliotis is used for food.

The curious mollusk whose picture you see on the next page is called Ianthina, which means violet-colored, and the thin shell is of the deepest violet color, except the spire, which is white. It is also called the Violet-Snail and the Ocean-

Snail. The Violet-Snails live together in large numbers in the open sea, where they float by means of their curious rafts. They are said to feed upon jelly-fishes. When handled they give out a violet liquid, or dye. The raft consists of little sacs of



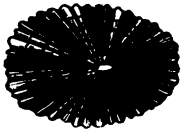
The Violet-Snail, or Ianthina.

air, and to the under side of it the eggs of the Violet-Snail are fixed.

When the Violet-Snails are floating, only the little white rafts are seen, the beautiful purple shells being below the surface of the water. The delicate raft or float is not very firmly attached to the animal, and it is sometimes broken off by the dashing of the waves. After stormy and windy weather the rafts are seen drifting about on the top of the water, but without the shells, which sink in the ocean when the rafts are detached.

The Violet-Snails live in the Atlantic Ocean and in the Mediterranean Sea.

There are many kinds of univalves that are called Limpets. The Key-hole Limpet is so named because its shell has a hole through it which looks



The Key-hole Limpet.

The Cup-and-Saucer Limpet.

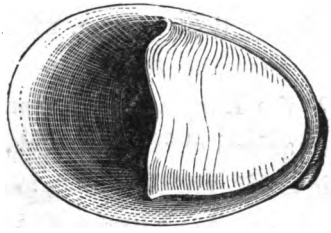
a little like a key-hole in a drawer or door. It is found on the sea-coast in all parts of the world.

In the shallow waters of the warm seas there are found curious limpets, called, from the shape of their shell, the Duck-bills. The color of the shell is white, or very pale yellow, but the little animal is black. The Duck-bill Limpets crawl freely about.

The Cup-and-Saucer Limpet is found on the sea-coast of many countries. It sticks close to stones and large shells, and does not move about. It feeds on sea-weed. It is often called the Bonnet Limpet.

The Slipper Limpet, whose picture I here show you, is found all along our coast. When alive it

sticks to stones and large shells where the water is shallow. It is also called Crepidula, a name which means a small sandal.



The Slipper or Sandal Limpet, or Crepidula.

The Patella, a picture of whose shell you see here, is one of the Rock Limpets. There are many kinds of these limpets; this one is found on the coast of New England. The Rock Limpets live

The Rock Limpet, or Patella.

on rocky coasts between the high and low tides,—that is, where the water will cover them twice every day, and where they will be left bare twice every day. The Rock Limpets, and all other

kinds of limpets, cling firmly to the rocks, so firmly that it is almost impossible to detach them, when alive, without injuring the shell. The Limpets feed upon sea-weeds, which they rasp from the rocks by their tongue, which is covered by about two thousand teeth.

The foot of the Limpet is very broad and thick; and when the animal clings to any object, the edge of its foot is firmly pressed down, and the centre is drawn back, forming a space or vacuum under it, and the pressure of the air upon the top of the foot keeps the Limpet firmly fixed in its place.

Limpets are used for fish-baits, and the people of some countries use them for food. On the western coast of South America there is one kind of Limpet which is a foot in diameter, and the people there use its shell for a basin.

The Tooth-Shell.

The Tooth-Shell is shaped like an elephant's tusk, and so it is often called the Elephant's Tooth. The shell is hollow and open at each end. It is

found on the sand and mud, in which it often buries itself; it feeds upon minute animals.


The Chiton.

Here is a picture of the little Chiton, or Coat-of-mail Shell. There are many kinds of Chitons, and some of them are much larger than this one. Like limpets, the Chitons cling firmly to rocks, and it is said that crows and other birds which come to feed upon these animals and the limpets, sometimes get caught by the point of their bill, and are there held so firmly that they cannot get away, and when the high tide comes in they are drowned. The shell is made up of eight plates or pieces, which lap over one another like the shingles or slates upon the roof of a house. The Chitons are found upon almost every shore, for they live in both cold and warm seas. Some kinds live in deep waters, but most kinds live near the shore where the water is shallow, and when the tide is low large numbers of them may be seen clinging to the rocks.

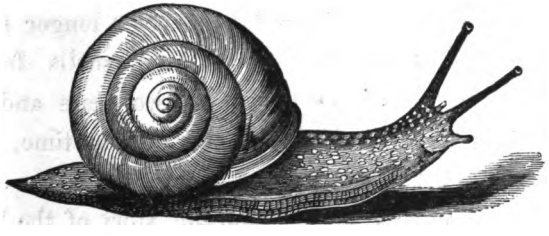
Almost all of the shells whose pictures you have now seen, and of which you have been reading, are found in the sea. But I will now tell you

about gasteropods, which live upon the land, and about others that live in ponds, brooks, and rivers. Those that live on the land are called the Land Snails, and there are many kinds, — more than four thousand are now known. Some kinds live in low wet places, others on hills and mountains, others in rocky places, and others upon trees. All feed upon decaying plants. You have often seen the

The Snail-Shell.

common snail-shell; here is its picture. It is easily found by searching under old logs, stumps, and leaves, where it likes to hide. In warm damp weather these snails come out of their hiding-places, and are seen crawling over the leaves and up the trunks of trees. On the next page there is a picture which shows you how the snail looks when it is alive and when crawling along. You see that

he carries his shell upon his back. His eyes are upon the ends of the two long stalks, or stems, which grow out of his head. If you touch these little stalks, or horns, of the snail, he quickly draws them back, but will soon push them out again, if you do not disturb him. If you take



The Snail.

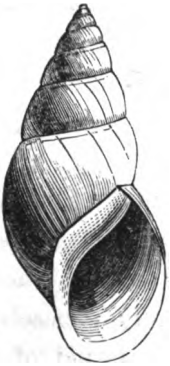
the Snail into your hand, he will draw himself back into his shell, and all that you will be able to see of him is a mass of soft flesh at the open part of the shell. In the spring the snail lays its little eggs in the ground near a stone or a stump; she does not stay near and sit upon them as birds sit upon their eggs to hatch them, but leaves them, and in a month the little snails appear.

When the cold autumn weather comes, snails crawl into as warm and cosy a place as they can find, then close the mouth of their shell with a little thin skin which they form, and by and by they go to sleep and take a long nap; for they do not wake up until the warm sunny days of the next spring have come.

Snails have sometimes taken even a longer nap than a whole winter. Some land snails from Madeira were kept in boxes for two years and a half, and were alive at the end of that time, although they had not been fed.

But there is a more wonderful story of the life of a land snail, which I will tell you. A Desert Snail was brought from Egypt and fixed to a tablet in the British Museum, a great natural history collection in London. About four years afterwards it was noticed that it had been out of its shell, and had tried to get away, but finding it could not, it had retired again within its shell. It was then placed in warm water, and found to be alive and well as ever.

Here are pictures of three other kinds of snails, which live upon the land. The Bulimus is said



The Bulimus Shell.

The Pupa Shell.

The Amber Shell.

to get its name from a word which means very hungry. One kind of Bulimus grows to be as long as this book, and it lays its eggs among the leaves, and they are as large as those of a pigeon! The Bulimus Shell, whose picture I here show you, is found in California.

The Pupa or Chrysalis Shell gets its name from its form, which, as you can see, is very much in the shape of a pupa or chrysalis of a butterfly or moth. This one is found in Florida.

The Succinea or Amber-Shell is found in marshy places. The one whose picture you see here is found in the Western States.

This little snail is called the Limax, or Slug. In warm damp weather you can find it in the

The Slug, or Limax.

garden or field, or in the woods. Slugs often climb trees, and some kinds can let themselves down by a thread which they spin. When the weather is dry or cold, they bury themselves in the ground. One kind, from the Island of Teneriffe, has a bright spot on the tail, which shines at night like the light of the fire-fly.

The Physa.

The Planorbis.

The Limnæa.

Great numbers of these little snails live in ponds, brooks, and rivers, usually among the weeds, upon which they feed. If you watch for them, you may sometimes see them floating and gliding at the

surface of the water, with the shell downward. They come to the top of the water to breathe. They lay their eggs in clear masses on plants and stones in the water. Their shell is very thin.

Here are pictures of three little land shells, two of which you may some time find. The Helicina

Helicina.

Cyclostoma.

Acicula.

and the Cyclostoma are found in this country, and the Acicula in Europe.

The Tornatella is a sea-shell, and when alive lives

The Tornatella.

The Bubble-shell.

in deep water. The Bubble-shell is very thin, and this is the reason, I suppose, it is called by this name. It is found in the sea.

I will now tell you about some of the sea-slugs. They have no shell, but the animals are very pretty, and often very beautiful. They are found in all parts of the world where the coast is rocky, in the cold arctic regions as well as in the warm seas. They crawl about on the sea-weeds, and sometimes they swim. When young they have a shell, but it disappears as they grow older. The gills by which they breathe are upon the back and sides, and these make the beauty of the animal; for they are of the most graceful forms, like little leaves and tufts of mosses. These mollusks are very shy, and when alarmed or disturbed they draw themselves into a little lump, and are often passed by without attracting notice. Some kinds of sea-slugs are less than half an inch long; others are more than three inches in length.

The Doris, or Sea-Lemon.

This one is called the Doris, or Sea-Lemon. You see in the picture the little moss-like tuft of

gills. This kind lays its many little eggs in a ribbon-like mass, coiled like a watch-spring, and fixed by one of its edges to some object in the sea.

The Tritonia has its gills along both sides of its body; they are arranged in little leaf-like tufts.

The Tritonia.

It has horny jaws, and many little teeth. It lives in shallow water, and is found under stones. It feeds upon little animals. One kind grows to be six inches long.

The Æolis.

The curiously formed Æolis also lives in rather shallow waters, and is found among the rocks when the tide is low. There are more than thirty kinds of the Æolis, and they are very active little

animals, and swim about upon the back. Their breathing organs or gills are in little plume-like tufts or bunches along the sides of their body, these little tufts look somewhat like little bunches of flower-stamens. For their food they eat hydroids, — little animals which I will tell you about in your next book, — and when very hungry, and if they cannot get other food, they will eat one another.

The Atlanta has a little, coiled, glassy shell.

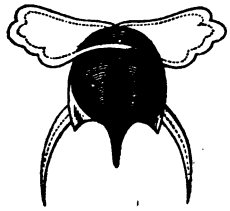
The Atlanta.

One of its fins for swimming has a little fringed sucker, and by this the little animal can moor itself to objects in the sea.

These little mollusks, whose pictures you see on the next page, live together in the greatest numbers, far from the shore in the open sea. They are so numerous that the water appears to be alive with them, both in warm and cold seas. They swim, or move about in the water, by flapping their fins; these look a little like wings, and these little animals are often called the Wing-footed Mollusks,

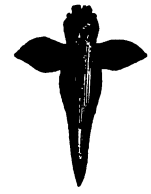
and the Sea-Butterflies. Some kinds of them have a shell, but it is thin, light, and delicate, and covers only a part of the body.

The Hyalea is named from a word which means glassy, for it has a thin horny shell, as clear as glass.



The Hyalea.

Limacina.



The Clio.

The Limacina lives in the cold parts of the ocean. Its name means snail-like.

The Clio is exceedingly abundant in the cold parts of the ocean, but some kinds are common in the warm parts of the ocean. You may like to remember that the name Clio means sea-nymph.

All of the wing-footed Mollusks are very wonderful little creatures; much more wonderful than you suppose from seeing their pictures, or from what I have already told you. When you are

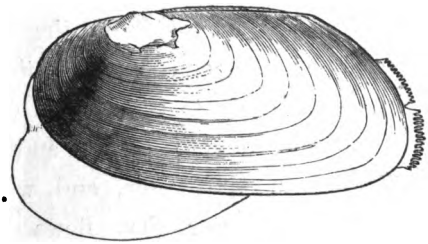
older you will want to learn more about them. But I will tell you something more about one of them now.

On the head of the Clio there are numerous cone-shaped bodies, which are arranged in the form of a little tuft, or crown, as you may see in the picture. On each one of these little bodies there are about three thousand points. By examining these points with a powerful microscope, naturalists have found each one of these points to be a sheath, within which there is a sort of stem, upon the end of which there is a tuft of about twenty suckers, each with a smaller stem; so that on the crown of one Clio there are about three hundred and sixty thousand of these suckers!

The Wing-footed Mollusks are also very useful; for they are the food of many other animals, and of those that are of great use to man. The Clio is the principal food of the Whalebone Whale, or Right Whale, as it is generally called. Swimming through schools of Clios, the whale takes into his enormous mouth many thousands, and perhaps millions, of them at once; then straining off the water through the whalebone, he swallows them and moves on for another mouthful.

THE HEADLESS MOLLUSKS, OR ACEPHALS.

THE next time you go to the brook, or pond, you may look for Mussels. Do you know what a mussel is? Here is the picture of one as it looks when

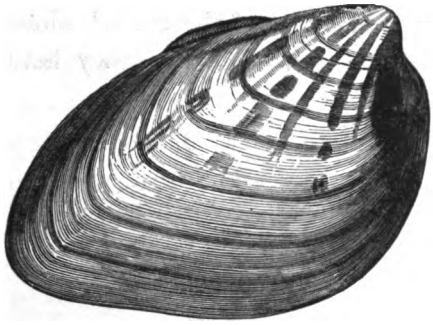


A Fresh-water Mussel.

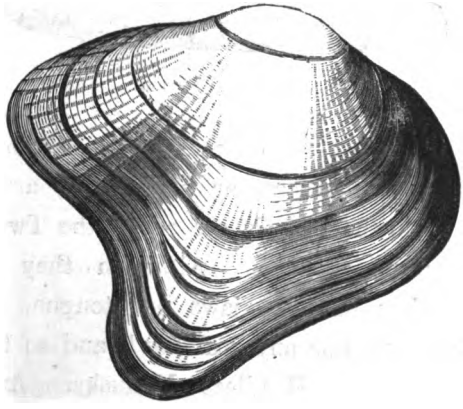
alive, and when its "foot" and tubes are extended. It has a brown or greenish shell, made of two pieces which are fastened together at the upper side by an organ called a hinge. The animal is in the inside, between the two valves, and it can hold the pieces or valves of the shell together so tightly that a man cannot pull them apart; but it can open and shut the shell just when it wants to.

You may wonder what those little fringed tubes are for. If you will get a mussel and put it into a basin of water, and watch it without touching it, you will see that a current of water goes into one tube, and that another current comes out of the other tube. The water which goes in carries in air and food for the Mussel; for you must know that the mouth is in the inside of the shell, and at the end opposite the tubes. All that the Mussel gets to eat for his dinner or his supper are the minute plants and animals that are floating in the water, and which get into the current of water that flows into the tube.

There are many kinds of fresh-water Mussels. One of the most common is the one which I have just shown you; but on the next two pages there are pictures of others which perhaps you may see sometimes, for they live in the rivers and ponds of this country. The Club Unio and the Waved Unio are found in the rivers and ponds of the Western States; and the Shepard Unio and the Spiny Unio are found in the ponds and rivers of the Southern States.

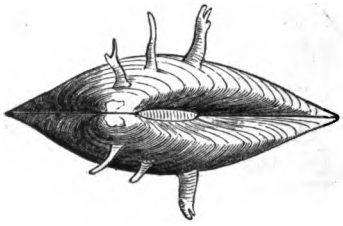


The Club Unio.



The Waved Unio.

There are many other mollusks which have a shell much like that of the mussel whose picture I have shown you, — that is, they have a shell



The Spiny Unio.

The Shepard Unio.

which is made of two pieces joined together by a hinge. These pieces, or half shells, are called valves; and the animals are called the Two-valved Mollusks, or Bivalves. Although they have a mouth, they have no jaws nor tongue, no eyes nor tentacles, nor any real head, and so they are often called the Headless Mollusks. And they have no need of a head; for all they have to do

to get food to eat is to keep still and make the water flow into one little tube and out of the other.

All of the Bivalves live in the water, and most of them live in the sea. They are of all sizes, from those scarcely larger than the head of a pin to those whose shells are so large and heavy that you cannot lift one of them, and there are shells so heavy that a strong man can hardly lift one of them. Some kinds weigh more than five hundred pounds each.

The Oysters, and some other kinds of bivalves, lie upon one side, and in these the lower valve is deeper than the upper one; but many kinds of bivalves live in erect position, resting on the edges of their shell, and some kinds live half buried in the sand and mud.

The Oysters are among the most useful of all the mollusks, and great numbers are taken from the sea every year, and are sold in the markets for food. You have often seen these mollusks, and you know that their shell is very thick, and that one of its valves is larger and deeper than the other, and that the shell is rough and of a

dark color upon the outside, but is white and very smooth and pearly within.

Oysters live in the warm and temperate waters of almost every sea and ocean, but are not found in the waters of the cold regions. They live in water which is several feet in depth, and are found together in large numbers, sometimes covering the bottom of the sea for miles and miles; these places in the sea are called oyster-beds and oyster-banks.

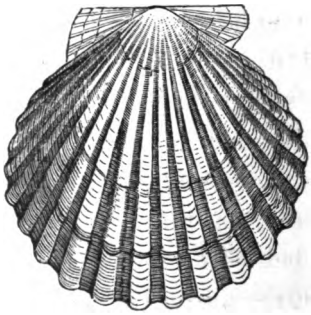
The "foot" of the Oyster is very small, and some kinds even do not have any foot, and so these animals cannot move about from place to place, but are fixed to the same spot for life; they are attached by one of their valves to a rock, or to each other, or to the bottom of the sea.

Oysters increase very rapidly; it is said that a single oyster produces several hundred thousand eggs each year! The eggs are laid in the summer, and each young oyster has a perfect little shell when it is first hatched, and at this time of its life it swims about in the water by means of a little fringed organ, called the swimming-pad, which is attached to its shell.

There are at least sixty kinds of oysters now living in the seas and oceans of our earth; but many more than this lived in the old oceans; more than two hundred kinds have been found in the rocks of the different countries; some of these were very large; one kind is found which is two feet in length!

Oysters are usually obtained by dredging; the dredge consists of a strong iron frame, to which a large net is attached. The fishermen go out in boats, and when they reach the oyster-beds the dredge, which is fastened to a stout rope, is thrown overboard and lowered into the water till it strikes the bottom of the sea; the boat then moves on, dragging the dredge, which scrapes along on the bottom of the sea, and in this way detaches the oysters, which are caught in the net. In the Mediterranean Sea, near Minorca, oysters are obtained by divers who go down to the depth of fifty to seventy feet, until they reach the bottom of the sea, and bring up the oysters in their hands. The divers go down with hammers attached to the right hand, and with the hammers they detach the oysters, which they bring up in the left hand.

There is one very curious kind of oyster called the Tree-Oyster, because it is found attached to the roots of the mangrove-trees, which stand close to the water. The natives cut off the roots loaded with oysters, and thus easily get all they want. Sometimes by a single blow of the axe or hatchet they get a root which holds as many oysters as a man can carry.



The Pecten, or Scallop-Shell.

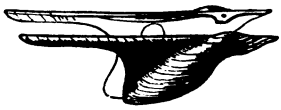
Here is a picture of the pretty Pecten, or Scallop-Shell, which little girls sometimes like to get to place upon the sides of their pin-cushions. It is shaped a little like an open fan, and so it is often called the Fan-Shell. Another name for it is

Comb-Shell: the word Pecten means a comb. There are more than a hundred kinds of Pectens, and some of them are found in every sea and ocean. Many kinds have very bright, pretty colors. Nearly all of the Pectens, when they are very young, spin a byssus of horny or silken threads, by which they fasten themselves to sea-weeds and other objects in the water, but when they are older they move freely about in the sea. They swim by opening and then quickly closing the two valves of their shell, thus forcing out the water, which sends them swiftly backward; in this way they swim quite rapidly.

One kind of pecten is called the Pilgrim's Scallop-Shell, and sometimes Saint James's Shell, because many years ago it was worn on the front of the hat by the people who made pilgrimages to the Holy Land.

The Scallops are very highly prized for food, and great numbers are gathered for this purpose in Long Island Sound. The shells of one kind of scallop were once used to cook oysters in, and oysters cooked in this way were said to be "scalloped."

This shell is named Avicula, a word which means a little bird. It has this name because the shell spreads out broadly on the side, somewhat like



The Avicula, or Little Bird.

little wings; and the shells are often called the Wing-Shells. There are not less than twenty-five kinds of them, and all live in the seas and oceans of the warm regions. The inside of these shells is lined with a beautiful pearly substance called nacre, and also called mother-of-pearl. You have often seen it, for it is much used in making knife-handles, paper-folders, card-cases, and many other useful and beautiful articles; it is also used in ornamenting writing-desks, jewel-boxes, and many kinds of cabinet-work. Nearly all of the beautiful and costly pearls, so highly prized as jewels, are obtained from shells which are very much like the Avicula. The shells from which the mother-of-pearl and the pearls are obtained are called the Pearl-Oysters. The Aviculas are

attached by the byssus which they spin to rocks, and other objects in the water, or to the bottom of the sea; and they live in water which is many feet in depth.

You will like to read about the pearls, and learn how the shells in which they are found are obtained from the deep waters of the sea, and so I will tell you a little about the pearls and the pearl-fisheries.

The Pearl Oysters live in the Chinese seas, in the Red Sea, and on the coast of California, and in many other places; but those in which the costliest pearls are found, and which furnish the most beautiful mother-of-pearl, live in the Indian Ocean. Mother-of-pearl, or nacre, as it is called, is the hard, brilliant substance which lines many kinds of shells; it has a bright, silky lustre, and in most kinds its color is pure white, or white tinged with blue, and glistening with rainbow colors; but some kinds of shells have nacre of a beautiful silvery hue; and other kinds have it of the color of gold. In the Pearl Oyster it is of the purest white color, and the plates of it are thicker than in any other kind of shell.

The Pearl-fisheries of some of the countries of

the East are so important that they are under the direction of those who rule the country, and large sums of money are sometimes paid for the right to fish for the pearl oysters. In some parts of the Indian Ocean the labor of pearl-fishing begins early in the year, in February or March, and it lasts about thirty days. As many as two hundred and fifty boats come from different parts of the coast to engage in the work of pearl-fishing; they reach the "fishing-grounds" very early in the morning, — about the break of day, — and their arrival is announced by the firing of a signal-gun. In each boat there are at least twenty men; ten of these men are oarsmen, and they row and take care of the boat; the others are divers, and they go far down to the bottom of the sea, and collect the pearl-oyster shells. But from each boat only five men go down at a time; the others rest, and take their turn in diving. They go down to the depth of forty or fifty feet, and sometimes even deeper, but never more than seventy-five feet. Most of the divers remain under the water only about half a minute; but some of the best divers can remain under the water a minute, or a minute and a quar-

ter, but not longer than this. When the diver is ready to descend he steps upon a large stone, which is fastened to a rope, and the heavy stone helps him to go down quickly; the stone weighs about fifty pounds, and sometimes the cord to which it is attached has a sort of stirrup in which the diver may place his right foot, but when there is no stirrup, the diver rests his foot upon the stone with the cord between his toes. The diver must take down with him, into the sea, a net in which to put the shells which he gathers, and he carries this net with his left foot; he presses his left hand over his mouth and nostrils, and in his right hand he carries a cord, called the signal-cord, because when he wishes to ascend, by pulling upon this cord he gives a signal to those who are in the boat above him, and they quickly pull him up. When the diver has reached the bottom of the sea, he takes his foot from the stone, throws himself upon his face, and begins to pick up all the pearl-oysters that he can reach, putting them in his net. A diver can go down five or six times during the forenoon, and some of the best divers can go down as many as fifteen or twenty times during the forenoon,

if the sea is calm. The divers keep at work until noon, when a gun is fired, which is the signal to cease fishing. The boats come on shore, and their owners, or the men who are carrying on the pearl-fishery, oversee the unloading of them, which must be finished before night comes on, so that none of the pearl-shells may be stolen.

Diving is not only very hard work, but it is very dangerous work also, for the great fierce sharks often lie in wait to seize and devour the poor divers.

The Pearl-fisheries of the Persian Gulf, the Arabian Gulf, and the Red Sea do not commence until later in the year, — in July and August, — when the sea is much calmer than in other months.

After the Pearl-shells have been brought to the shore, they are piled up on mats of grass, where they remain about ten days; they are then thrown into sea-water, and are washed and cleansed; the pearls are placed by themselves, and the valves of the shells, which are lined with beautiful mother-of-pearl, are packed in casks, or cases, ready for sale.

The pearls are sometimes found attached to the valves of the shell, and sometimes they are found in the animal itself. And after the animals have been

looked over, and all the pearls that can be seen have been taken from them, they are boiled and sifted through very fine sieves, in order to save the very smallest, or seed pearls, as they are sometimes called.

The pearls which are found attached to the valves of the shell are not often regular in shape, and they are sold by weight. Those that are found in the body of the animal are round, or oval, or pear-shaped, and they are sold singly. Pearls are smoothed and polished by placing a large number of them in a bag with powdered mother-of-pearl, and then working them over, and shaking them about. When polished they must be sifted and sorted, so as to get those of the same size together. The sieves for sifting pearls are twelve in number, and they are made so as to be placed one within another; the one having the largest holes being at the top, and the one with the smallest holes at the bottom, and so the large pearls are retained in the first sieve, the next sieve retains those a little smaller, and so on, until in the lowest sieve the little seed pearls are retained.

You will like to know the cause of these beautiful

pearls, and how they are formed, and I will tell you. Almost always in the centre of the pearl there is a little particle of something which is not like the pearl, and which has found its way into the soft body of the animal, or between the animal and its shell, a grain of sand perhaps, or the little egg of a fish, and the brilliant layers of pearls which make the costly gem have all been deposited around this little particle.

The people who live in China have long known this fact, and they have used their knowledge of it not only in making many pearls, but in producing beautiful pearl cameos, and in making many curious and beautiful toys of pearl. They get the living mollusk, which is not the pearl oyster, but is a river-mussel, and place on the inside of the shell, or in the fleshy part of the animal, a round grain of sand, or a bit of glass or metal, and then they put the animal again into the water, — so that layers of pearl may form around the little particle; and in this way the Chinese have made many pearls. Sometimes they make a string of pearls by placing in the animal a string to which many little grains of a mineral called quartz are attached;

and they get pearl figures of men by placing in the shell little tin figures of them.

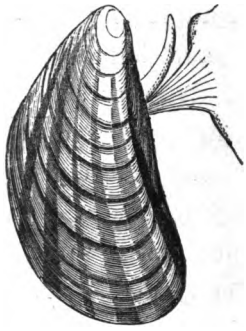
Very large pearls are sometimes found in shells. One found at Panama nearly three hundred years ago, and sent to the King of Spain, was of the form of a pear, and it was about as large as a dove's egg. It was valued at twenty thousand dollars. I have read of a pearl which it is said was sold to the Shah of Persia for the great sum of nine hundred thousand dollars! And it is said that the Shah of Persia possesses a string of pearls each one of which is nearly as large as a hazel-nut. The people who lived many years ago in Rome were very fond of these jewels, and very large and brilliant pearls were owned by some of them. It is said that Julius Cæsar once gave away a pearl which was worth of our money more than two hundred and fifty thousand dollars.

Beautiful and valuable pearls are sometimes found in the common mussels which live in the brooks of this country.

The Salt-water Mussels live on almost every coast, even on the coast of the cold icy seas of the North; and when the tide is low, great numbers

of them may be seen in the mud-banks which are then uncovered, and in the fissures and crevices in the rocks, and in the little pools of sea-water which are left upon the beaches. There are more than fifty kinds of these mollusks, some of which are very useful to man.

All of the sea-mussels can spin a strong byssus of silky or horny threads, by means of which they



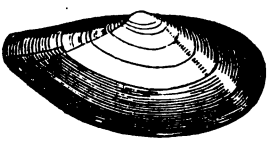
The Sea-Mussel, or Edible Mussel.

fasten themselves securely to rocks, large sea-plants, and other objects in the sea, and sometimes large numbers are attached to each other by their curious silken threads. Many kinds of sea-mussels seem to like to conceal themselves, and sometimes

they burrow in the mud, or creep into the burrows which have been made by other kinds of mollusks, and sometimes they make a sort of nest of sand and fragments of broken shells, which are held together by the silken threads which they spin. The shell of the mussels is rather thin, but it is covered by a thick skin, and inside it is smooth and pearly; and small pearls are sometimes found in the mussel-shells.

The Sea-Mussels are used for bait in catching fishes from the deep waters of the sea, and thirty or forty millions of these mollusks are taken every year from the Frith of Forth alone, for this purpose.

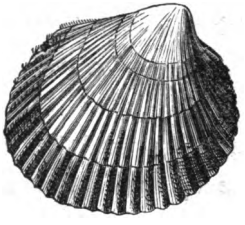
One kind of sea-mussel is called the Edible Mussel, because it is eaten for food. For several hundred years this mollusk has been cultivated on the coast of Europe.



The Leda.

The Leda, whose picture you see upon this page, is a bivalve which is found on the coast of New

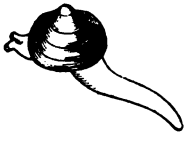
England. There are many kinds of the Leda-shells; some of them are found in the cold seas far to the North; other kinds are found in the warm seas of the tropical regions. They live in deep water.



The Cardium, or Cockle-Shell.

Here is a picture of the pretty Cardium, or Cockle-Shell, which is often found on the sea-beaches of New England. It is somewhat heart-shaped, and so it has been named Cardium, from a word which means a heart. There are as many as two hundred kinds of the Cockle-Shells, and some kinds are found in every sea and ocean; some of the cockles live in the shallow waters near the shore, and others live where the water is several hundred feet in depth. The common cockle, which in some of the countries of Europe is much used

for food, lives on sandy beaches. It has a large stout "foot," by means of which it often buries itself in the sand to the depth of four or five inches, — its two long breathing-tubes being just even with the surface of the sand; and you can often perceive just where the cockle is by the little jet of water which it throws up from the sands. It moves about on the bottom of the sea by pushing with its foot against the ground, in the same way as boats are often moved about by pushing with an oar against the ground; and by stiffly bending its curious and wonderful foot and quickly letting it go with a sudden spring, it can jump and leap about in the water and on the beach quite smartly.



The Sphærium, or Globe-Shell.

This little Globe-Shell is found in the rivers of the northern and western parts of our country. The shell is short and thick, and of a rounded form, and it is from its shape that the little

animal gets its name. Its foot is very long, as you may see in the picture. There are many kinds of shells which are very much like this one, and they are called the Cyclads, from a word which means a circle.

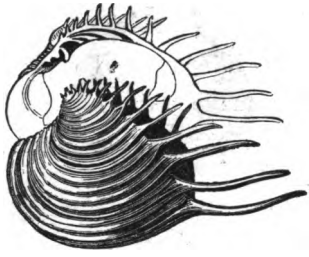
The Astarte.

The Astarte lives in the deep and cold waters of the ocean, and its shell is often found on the coast of New England. The skin which covers the shell of the Astarte is very thick, and of a dark color.

There are not many kinds of the Astarte living in the ocean now, but many thousand years ago they were very abundant; and in the rocks, which were once the soft muddy bed of the old oceans, there are found not less than two hundred kinds of these shells.

There are two or three hundred kinds of the

Venus-Shells, and all of them are very elegant in form, and many of them have bright and beautiful colors. There are some kinds in every sea and ocean, but the most beautiful kinds live in the waters of the warm regions. Here is a picture



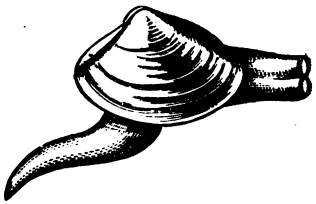
The Cytherea, or Spiny Venus-Shell.

of one which is found in the ocean near the West India Islands. It has been named the Spiny Venus-Shell.

In France several kinds of these mollusks which live upon the coast are gathered and used as food, and many people like to eat them as well as you like to eat oysters.

If you have ever read about the wampum of the Indians, you have learned that wampum is the Indian name for coin, or money; and that

the money of the Indians was not the gold, silver, and copper coin which we use for money, but, instead of these, it was strings of broken shells. In making their wampum the Indians often used the Venus-Shells which had been thrown upon the shore by the waves. The Indians gathered the whole shells, and the fragments of those which had been broken, and shaped them into form, and then made a hole in each piece, and strung them upon strings made out of the skins of animals.



The Mactra.

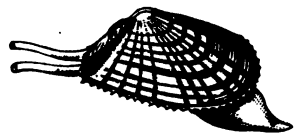
The Mactras live on the sandy parts of the sea-coast, and bury themselves just beneath the surface of the sand. They can stretch out the foot very far, and they can move it about like a finger, and by means of it they can take short leaps. There are many kinds of mactras, and

some of them are very large. The one whose picture you see here is found on the coast of Europe; but they are very common on our own coast, and some of the kinds are very large. The whelks and star-fishes like to feed upon them.

The Tellinas are found in every ocean. They live where the water is shallow, and bury themselves in the sand and mud. Many kinds of Tellina are richly colored and beautifully ornamented. This one is found on our coast, and

The Tellina.

this one, which is shown as it looks when its



The Tellina.

foot and tubes are extended, lives on the coast of Europe.

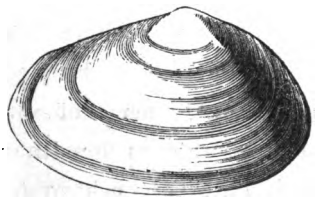
On the next page there is a picture of a curious mollusk, called the Razor-Shell, because its thin shell

is shaped like the handle of a razor. It is also called the Solen, a name which means a tube. There are many kinds of razor-shells, and some kinds are found on almost every sandy beach.

The Razor-Shell, or Solen.

The Solens live buried in the sand in an upright position, and if you are walking on the beach, when the tide is very low, you may see the little jets of water which they throw up from their breathing-tubes, and if you look closely you may see the openings to their little burrows; the opening is shaped somewhat like a keyhole. The Solens move up and down in their burrows, and when the tide is high they stay near the surface of the sand, and when the tide is low they go down deeper into the sand, sometimes going down one or two feet. They do not leave their burrows unless forced to do so, and if they are taken out and left upon the sand they quickly bury themselves again. A great many Solens live on the

coast of Chelsea, Massachusetts, and people gather them and use them for food. The Solens move very rapidly, and in digging for them the men have to work very fast, or these mollusks get away from them by going quickly downward in their burrows. Although the Solens live in the salt-water, salt itself is very disagreeable to them, and men sometimes catch them by dropping it into the openings of their burrows; these mollusks come up to push out the salt, and they may then be caught if the person who is trying to get them moves very quickly; if not caught at once, the Solens go far down into the sand, and nothing will induce them to come up again.



The Clam, or Mya.

The Clams also live in the salt-water, and burrow in the sand and mud. You have often seen these mollusks, for large numbers of them

are gathered and sold in the markets for food. Many are also caught and used as bait in fishing for cod and for other sea-fishes. The common Clam, whose picture I have shown you, burrows into the sand and mud to the depth of a foot; large numbers of these animals live near each other, and the little holes, which are the openings to their burrows, are often seen upon the beach when the tide is low. As you come near the openings you may see little jets of water thrown up from them. You will like to know what causes these jets of water, and why the Clams throw them up, and I will tell you. The Clam lives buried in the sand and mud, and does not move about in search of his food, and so all that he has to nourish him must come from the sea-water which flows into his body, and which carries in the little particles of food which may be floating in the water near him; and, like the river mussel, of which I have told you, the Clam has two tubes, which he pushes out from between the two valves of his shell, into one of which the water enters, carrying in air and food, and from the other the water flows out of the body

bringing with it the waste particles. The tubes of the Clam are very long, — that is, the Clam can stretch them out far beyond the edge of his shell, — and they are joined together so that at first sight there seems to be only one tube, but if you look at the end of this tube you will see the two openings, one of which is larger than the other, and if you place the Clam in a basin of sea-water, and watch him closely after he has pushed out his long tubes, you will see a current of water flowing into the larger opening, and another current of water flowing out of the smaller opening. These currents of water are caused by the many fine hairs — called cilia, from a word which means an eyelash — which cover the breathing organs, or gills, of the Clam, and which are in constant motion. The little Clam pushes his long tubes up towards the surface of the sand, and by means of the cilia they are filled with water, but when he feels the jar of a footstep upon the sands, he becomes alarmed, and draws his tubes back into his shell so quickly that the water in them is forced out and streams up into the air to the height of several inches, making

the little jets of water which you may have seen.

The Pandora.

The Pandora is found on the sea-coast in many parts of the world. It lives in rather deep water, and burrows in the sand and mud. Its shell is thin, pearly within, and is very pretty.

The curious mollusk called the Watering-pot Shell lives only in the warm seas of the tropical regions. It is enclosed in a hard shelly tube, which lines the hollow that the animal bores, for this is one of the boring mollusks. The tube is long and tapers slightly, so that one end is smaller than the other; the smaller end is frilled, and the large end is rounded, and is pierced with many tubular openings; the tubes of the outer row are the largest, and they surround the others, as the corolla of a flower surrounds the stamens and pistil; it is from the rounded end of the tube and its many openings, which makes this end look a

little like the rose of a watering-pot, that this mollusk has been named the Watering-pot Shell. The two valves of its shell are very small, as you may see by looking at them in the picture, and

The Watering-pot Shell.

they are not free, but are firmly joined to the hard tube. The smaller end of the tube is open, and there is also a little opening near the larger end, and thus the water flows freely into and through the shell.

The tubes of the Watering-pot Shell are some-

times found in the burrows of other kinds of mollusks, and they are found in holes in rocks, and in corals; but these mollusks usually make their own burrows. Some kinds bore into sand; other kinds bore into wood; some kinds bore into the thick shells of other mollusks, and some kinds even into stone. The one whose picture I have shown you bores in the sand; it lives in the Red Sea, and is about twice as large as the picture.

Here is a picture of a little mollusk which bores into stone, and into hard shells; when boring into

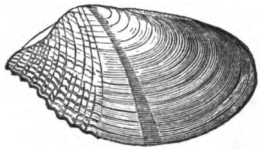
The Gastrochæna.

an oyster-shell, it often gets quite through the shell and enters the ground under it, and then forms a tube of small shells and grains of sand, and other small materials which are near.

The Pholads are other kinds of boring mollusks, and these are so called from a word which means to bore. These animals bore into almost

all kinds of substances; some kinds of pholads bore into mud and clay, and some into wood, but most kinds bore into the solid rocks; their burrows are upright and just deep enough to contain the animal and its shell. The shell of the Pholas is white, and as thin as paper, and very brittle, like glass, but it is very hard, much harder than the shells of most mollusks, and on the front are many rows of hard points, so that this part of the shell is like a rasp, and it is believed by many that it is by means of its rasp-like shell that the Pholas bores into hard rocks. Others believe that the Pholas uses its stout foot in boring into the rocks; for it is said that there are on the foot little particles which are as hard as flint, and that it is these which wear away the rock. On the next page there are pictures of two kinds of Pholas; one picture shows the outside of the shell, the other shows the inside of the shell. Some kinds of Pholads live upon almost every coast; and the substance in which they have been found boring has been taken from the sea, and placed in sea-water, so that the animals could be watched while they were at work; and they have been seen to turn from side

to side in their cells, moving about half-way round, then turning back and moving in the opposite direction; and they ceased boring as soon as the hole



The Pholas.

The Pholas.

was deep enough to shelter them. In boring, the foot of the mollusk is firmly fixed to the bottom of the hole, and thus they can easily turn their shell from side to side.

The young pholads begin to bore almost as soon as they are hatched, and enlarge their burrows as they themselves increase in size.

The Pholads are often caught and eaten for food. They are also used as bait in catching fishes.

Many kinds of mollusks give out a bright light in the dark, but none shine more brightly than the Pholads, and a person who is eating them in the dark seems to be eating fire.

But I must tell you about a very curious mollusk which is called the Teredo or Ship-Worm. The name of Ship-Worm has been given to it because the animal is long and soft like the common earth-worm, and because it bores into the timbers of ships; it bores into the timbers which are below the surface of the water, and often does great harm to them, and sometimes when many of these mollusks attack and bore into the bottom of a ship they perforate the timbers so completely that they crumble and fall in pieces, and thus the ship is destroyed. It is said that vessels thus mined and perforated by the ship-worm have gone down in the open sea with all on board.

The Ship-Worms also bore into the timbers of wharves and bridges, and sometimes wholly undermine them, so that although they appear to the eye to be firm and strong, they are really almost hollow, and are crushed by a slight weight or jar, and the whole structure which they support falls in ruins into the water.

The piles which support the dikes and sea-walls of Holland were at one time attacked by the Ship-Worms, and the people of that country became alarmed, fearing that the sea-walls might fall, and the sea might then flow in and cover much of the land, for Holland is very low or flat, and a large part of it has been reclaimed from the sea, — that is, sea-walls and dikes have been built to prevent the water from covering the land. If it were not for this, when the tide is high, or when storms occur, the waters of the sea would flow in and cover a large part of the country.

For many years it has been known that the ship-worm will not bore into wood which is covered with iron-rust, and so ship-builders sometimes drive into the timber many short iron nails, with very broad heads, placing them in rows so that the heads are not very far apart; the water causes the rust from the nail-heads to spread over the spaces between the heads, and then the ship-worm never attacks the timber. Vessels are also protected from the ship-worm by covering the bottom with thin plates of copper.

There are more than a dozen kinds of these

boring mollusks; one kind, called the Giant Teredo, bores very deeply, and its tube is sometimes one or two yards in length, and is two or three inches through its larger part. When boring and advancing into the wood, the ship-worm does not draw its breathing tubes after it, but they remain where they were when the animal first began to bore, and by them a shelly tube is formed, which lines the burrow.

The shell of the ship-worm is rounded in form, and is sometimes marked with yellow and brown lines. The burrows of the many ship-worms which may be at work in the same piece of timber never run into one another, but in some way the animals know when they are near other burrows, and although the ship-worms usually burrow downwards and in one direction, they will make sudden turns and curves in order to avoid breaking into the burrow of another ship-worm.

When the ship-worm is very young, it is almost as round as a ball, and it swims freely about in the water for a day or two, but soon fixes itself to sunken wood, or to the bottom of a vessel, or to the timbers of wharves or bridges, and begins to make its way inward.

One kind of Teredo bores into the husks of the cocoa-nuts which are floating in the seas of the warm regions.

THE ARM-FOOTED MOLLUSKS, OR BRACHIOPODS.

THESE mollusks are called arm-footed from their long fringed tentacles or arms, whose form is seen in this picture, which shows the inside of the shell.

A Brachiopod with one valve removed.

They are also called the Lamp-Shells, because they are much like the form of the lamps that were used a very long time ago.

One valve of the Brachiopods is larger than the other, and through the larger valve there is a hole,

and from this hole there is a stem called the peduncle, by which these animals attach themselves to rocks, coral, shells, and other objects in the sea.

The Brachiopods do not lie in their shell in the same way that oysters, clams, and mussels lie in their shell,—that is, with one side against one valve and the other side against the other valve; but they lie with one valve on their back and the other valve covering the under side of the body. And their valves are both opened and shut by muscles, while the Common Bivalves shut their shell by means of muscles, but open it by means of an elastic substance which is between the valves at the hinge.

No one has ever seen the young brachiopods when first hatched, and watched them till they were full grown, as many persons have watched the growth of some of the common kinds of mollusks; but it is believed that when first hatched they are free and able to swim about in the sea, and that afterwards they fix themselves to hanging rocks, branches of coral, and large shells of other mollusks.

There are some kinds of brachiopods that do not

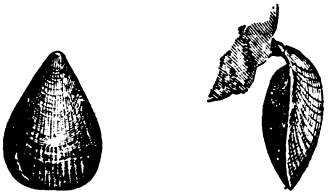
fix themselves by a stem, but in some way they fasten themselves to other objects by one of the valves of their shell.

The Brachiopods live in more kinds of places, and they live deeper in the sea, and they have lived longer on the earth, than any other kinds of mollusks; they live in the cold parts of the ocean far to the North, and in the warmest parts of the ocean in the tropical regions; they live in the deepest parts of the sea which the naturalist has been able to scrape with his dredge; and they were the first mollusks that were created to live in the old ocean which once covered all the places that are now dry land.

There are not more than one or two hundred kinds of brachiopods now living in the ocean, but thousands of kinds are embedded in the rocks. In many parts of our country, the rocks are so full of them that you cannot put your finger between them, they lie so near together. All of those that are in the rocks lived in the old ocean of which I have before told you. None of the kinds which are found in the rocks are living now.

The Brachiopod whose picture I here show you

lives on the coast of Maine, and it is called the Terebratula. It is shown as it looks when alive



The Terebratula, a Brachiopod.

and hanging from a shelving rock, also as the shell looks when it is dead, and without its stem..

The Lingula is a brachiopod which is found in

The Lingula, a Brachiopod.

the Pacific and Indian Oceans. It is twice as long as this picture, and is celebrated because the family or group of brachiopods to which it belongs is the oldest of all the Mollusks, — that is, the Lingulas were made by the Creator before any other mollusks.

The Arm-footed Mollusks, and the Cloaked Mol-

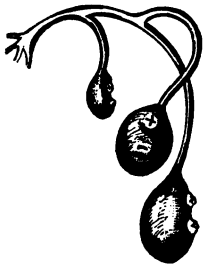
lusks and Moss Mollusks which I am soon going to tell you about, are fixed to rocks, shells, and other objects in the sea, many of them by a stem, and thus they are somewhat like plants; and so these three kinds are often called the Anthoid Mollusks, or Flower-like Mollusks.

THE TUNICATES, OR CLOAKED MOLLUSKS.

THESE curious mollusks have no true shell, but they have a tough, leathery skin, which surrounds and encloses their soft body, and so they have been named the Cloaked Mollusks, or Tunicates, from a word which means a cloak or tunic; and as they appear much like a bag which is in form somewhat like the water-skin or leather bottle in which the people of Eastern countries used to carry water, many of them are called the Ascidians, a word which means Leather-bags. They live in every sea and ocean, and some kinds may be found on almost every sea-coast.

There are many kinds of tunicates; some kinds live singly, each one by itself, and these are called

the Solitary Ascidians; other kinds live in groups, and are called the Social Ascidians; others are even more closely united, and are called the Compound Ascidians. All of these kinds, when very young, swim freely about in the water; they have a long tail, and look like very small tadpoles. After a while each little animal attaches itself to a rock, or to floating timber, or to seaweed, or to some other object in the water, or to the bottom of the sea, and is fixed there during the remainder of its life.



A Tunicate, or Cloaked Mollusk.

Here is a picture which shows you three of the tunic mollusks, or leather-bags. These have a sort of stem, and sometimes several of them become attached to each other by their stems.

This kind is found at New Zealand, an island in the South Pacific Ocean, and at Greenland in the North Atlantic, and one kind much like this is found on the coast of Massachusetts.

Some kinds of ascidians are no larger than a pea, others are as large as grapes, and others are as large as an orange or even larger; and some of them have very bright colors. There are two openings in the tunic of an ascidian: into one the water flows, carrying in minute particles of food; from the other the water passes out, carrying the waste particles of the body: the eggs also pass out of this opening; you can see the position of these little openings in the picture. The blood of these little animals does not flow all the time in one direction, as the blood in your body does, but it flows for a short time in one direction, then changes and flows for a short time in the opposite direction. And the young of these curious mollusks not only come from the eggs of the parent, but they also bud from the body of the parent, in much the same way as the little bud springs forth from the branch of a tree.

There are other kinds of tunic mollusks, called

Salpas and Pyrosomas, which live in the open sea, and are not attached to any object in the water, but swim about freely all their lives.

The little mollusks called the Salpas are very curious little animals, for they are sometimes found living singly, each little salpa by itself, and sometimes they are found living together in large numbers, the little salpas being attached one to the other in such a manner that they form strange living chains. These salpa-chains are in some cases only a few inches long; in others they are many feet in length; they are often coiled and waved, and so they are called garlands, bands, and ribbons.

There are many kinds of salpas, and some kinds are not more than half an inch long; other kinds are eight or ten inches in length. The covering, or tunic, of these little creatures — for they do not have a true shell — is shaped somewhat like a little tube, and it is so thin and transparent that all the internal parts of the curious animal which it encloses can be plainly seen through it, when they are of a color different from that of the tunic itself; but some kinds of the

Salpas are of the color of sea-water, and they are so transparent, that if you were looking down into the sea, you would not notice them, and they are not easily observed even in a small quantity of sea-water.

The tube-like body of the Salpa is open at both ends, so that water is all the time flowing in at one end of the body and out at the other. The Salpas swim about in the water by expanding and enlarging themselves, and letting the water flow in at one of the openings, — which is then shut by a little valve, so that the water cannot flow out of that opening, — and then contracting themselves and making it flow out of the other opening; they thus swim backward through the water, and, what is very curious, all the salpas in a chain expand and contract at the same moment, just as if the whole long chain were only one animal. The salpa-chains swim about, when the water is calm, with a serpent-like motion, and sailors often call them the sea-serpents. The salpas in a chain are attached to each other by little organs which are somewhat like suckers, and it is believed by naturalists who have observed

these animals that they have not the power to detach themselves one from the other, and that if in any way a salpa becomes separated from the chain to which it belongs it soon dies.

But I have told you that there are salpas which live singly, and the most curious and wonderful fact about these animals is that they are the young of the salpas which live in chains. Each little animal in a long chain of salpas contains one egg, which produces a salpa that lives singly, and each salpa which lives singly is the parent of a long chain of salpas; so that the young of the long chains are salpas which live alone, each one by itself; and the young of these solitary salpas are many little salpas, which live always in long chains!

There are other kinds of tunic mollusks which live together in immense numbers, and which are united together in rings, or whorls, in such a manner that the mass is like a hollow tube, which is open at one end and closed at the other. These are called the Pyrosomas, or Fire-bodies, because at night they give out a beautiful and brilliant light. They are from two to fourteen inches in length, and they live in all the warm seas. In

some parts of the Mediterranean Sea they are so abundant as greatly to trouble the fishermen by clogging their nets.

The Pyrosomas glide slowly through the waters, and at night, when their shining light is seen, they are very beautiful. It is said that nothing can then exceed the dazzling and splendid appearance of these floating tubes, which exhibit all the hues of the rainbow, and whose colors change rapidly from a brilliant red to yellow, from golden-color to orange, green, and blue; and the light which they give out is so bright that it illumines the waters around, above, and below them, to the distance of several feet. Humboldt, a very learned man, has told us in his interesting books that, by the light of these strange beautiful animals, he could look down into the water to the depth of twelve or fifteen feet, and see the fishes which followed the ship's track.

A gentleman who was crossing the sea once caught several pyrosomas, and used them to light up his cabin, and their light was so bright that he could read by it to his friends the description which he had written of these curious little animals!

THE MOSS MOLLUSKS, OR BRYOZOANS.

THE Moss Mollusks are very small animals, which live in clusters, and look very much like little plants. They are often called Polyzoans, a name which means many animals, and which was given to these mollusks because they are united in clusters or groups.

Many kinds of moss mollusks live in the sea, and some kinds of these form minute and beautiful corals, which you may often find in little delicate lace-like patches on sea-weeds, shells, and other objects in the sea. You may even find in the rocks, in many parts of our country, the little lace-like corals which were formed by the moss mollusks that lived thousands and thousands of years ago.

But there are also many kinds of these mollusks in the brooks, rivers, ponds, and lakes, and their forms are as beautiful as those of the most delicate plants, and their structure and habits are very wonderful. Captain Alpheus Hyatt has told us much about those that live in the rivers and ponds of our country, and when you are older you will

like to read what he has written about these interesting little animals.

In this little book about the Mollusks, you have learned that they have soft bodies, that they have many different forms, that they are very numerous, and that they are found in all parts of the world. You have learned that some kinds live on the dry land, some kinds on trees, some kinds in brooks, rivers, ponds, and lakes, but that they are the most numerous in the sea.

You have learned that some kinds have their feet attached to the head, and so are called Head-footed Mollusks, or Cephalopods; that others creep with the under side of the body, and so are called the Stomach-footed Mollusks, or Gasteropods; that others have no true head, and so are called the Headless Mollusks, or Acephals; that others have organs that are used for both arms and feet, and so are called Arm-footed Mollusks, or Brachiopods; that others are covered with a cloak or tunic, and so are called the Tunic Mollusks, or Tunicates; and that others resemble delicate plants, and so are called the Moss Mollusks, or Bryozoans.

You have learned that some kinds of the mollusks have a shell, and that other kinds are wholly without a shell; and that the shells of some are rough, and that others are smooth and ornamented with different colors in the most beautiful manner.

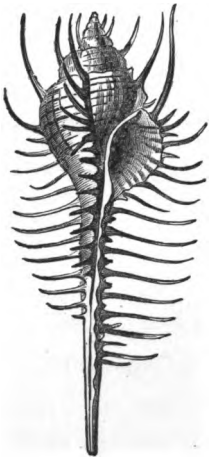
You have learned that the Mollusks are very useful both to man and to animals; that the right whale, which furnishes much oil and all of the whalebone in the world, feeds upon clios and other wing-footed mollusks that swim in the open sea; that the cod and the haddock and many other useful fishes feed upon those which they find on the bottom of the sea; that the birds feast upon those in the shallows and those left bare by the tide; that man highly prizes the oyster, clam, and the scallop; and that in many places he uses many other kinds of mollusks for a part of his daily food. You have learned that some kinds of mollusks yield rich dyes; that others have large shells, which are used in making many useful and beautiful articles; that the shells of other kinds are used in some countries instead of money; that the shells of others are worn as ornaments; and that from others are obtained the beautiful and costly pearls.

The shells of the old mollusks are also very useful to the geologist. Filling the rocks in almost every country, they aid him greatly in finding out the extent and the nature of the old oceans that once covered the countries that are now dry land, and thus help him to find out much about the world as it was thousands and even millions of years before there were men upon the earth.

The shells of mollusks are very interesting objects, and a large collection of them is very beautiful to look upon, and is also very instructive. It is a beautiful sight to see the different kinds of shells from the different parts of the world, all tastefully arranged in the neat white cases of a museum. There you may see Argonauts and Nautili, Strombs and Tritons, Harps and Cones, Cowries and Wentle-traps, Nerites and Limpets, Pectens and Mother-of-pearl, and all of the other beautiful shells of which I have told you, and hundreds of kinds besides.

If you save the shells which are given to you, and those which you find upon the sea-shore and in the brooks, you will soon have a beautiful little collection of your own.

I hope that what I have now told you about shells and the animals that live in them will make you want to learn more about these interesting objects which the Creator has made to live on the land, and in the rivers, ponds, and lakes, and in the sea, and which he has made to be so useful to other kinds of animals, and even to man himself.



THE END.